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REPORT ON PRELIMINARY STUDY OF SUBSURFACE CONDITIONS AND EVALUATION OF FOUNDATION REQUIREMENTS COLUMBIA POINT REDEVELOPMENT PROGRAM BOSTON, MASSACHUSETTS

BIND

GOLOBERG ZOINO DUNNICLIFF & ASSOCIATES, INC
GEOTECHNICAL CONSULTANTS

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Goldberg, Zoino, Dunn:
Report of Subsurface
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PROGRESS PRINT

REPORT ON PRELIMINARY STUDY OF SUBSURFACE CONDITIONS AND EVALUATION OF FOUNDATION REQUIREMENTS COLUMBIA POINT REDEVELOPMENT PROGRAM BOSTON, MASSACHUSETTS

for

Boston Housing Authority

Boston, Massachusetts

by

Goldberg, Zoino, Dunnicliff & Associates, Inc.

Newton Upper Falls, Massachusetts

May 1979

File No. 2286.1

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May 22, 1979
File No. 2286.1

Boston Housing Authority
53 State Street
Boston, Massachusetts 02109

Attention: Mr. David N. Carter

Re: Geotechnical Investigations
Columbia Point Redevelopment
Boston, Massachusetts

Gentlemen:

Enclosed herewith are six copies of our report entitled "Report on Preliminary Study of Subsurface Conditions and Evaluation of Foundation Requirements, Columbia Point Redevelopment Program, Boston, Massachusetts". This report has been prepared in accordance with our contract dated January 8, 1979.

The work has included evaluation of existing information plus making additional subsurface explorations to verify and supplement existing data. Subsurface explorations programs are described in Section 2.00 and the site is described in Section 3.00. Foundation and site development studies are discussed in Sections 4.00 and 5.00 respectively.

We have enjoyed working with you on this challenging project and wish you luck in your endeavors to improve conditions in the City of Boston. If we may be of further assistance or you have questions concerning this work please feel free to call the undersigned.

Sincerely,

Joseph D. Guertin, Jr./mc

Joseph D. Guertin, Jr.

JDG:jbj
Enclosures

30 TOWER ROAD · NEWTON UPPER FALLS · MASS. 02164 · 617-244-4100

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1.00 INTRODUCTION

1.10 GENERAL

This report presents the results of a preliminary study of subsurface conditions and evaluation of foundation requirements for the Columbia Point Redevelopment Program. This study was undertaken by Goldberg, Zoino, Dunnicliff & Associates, Inc. (GZD) for the Boston Housing Authority (BHA) in accordance with three contracts, dated January 8, 1979. The combined scope of work in these contracts included drilling, test pitting, field supervision of drilling and test pitting plus preparation of a geotechnical report. A fourth contract dated November 14, 1978 with the Boston Redevelopment Authority (BRA) was for drilling, test pitting and field supervision of explorations on BRA land.

The primary study areas are indicated on Figure 1, Project Locus, which is land adminstered by both the BHA and BRA. The limits of the primary study area begin at the west end of the existing Boston Housing Authority Columbia Point area and extends eastward across the existing housing development. Data are also presented for the BRA land between the Housing Project and Kennedy Library site. The total project area is approximately 65.4 acres of land, of which 27.6 acres are administered by the Housing Authority and 37.8 are administered by the Redevelopment Authority. It is reported that the 8.3 acre parcel of land immediately to the west of the Kennedy Library site is owned by the University of Massachusetts.

1.20 PURPOSE AND SCOPE

The purpose of this study has been to prepare a planning phase geotechnical report for prospective developers of the Columbia Point area. The information presented herein is not intended to be sufficient for final design of rehabilitated and new facilities. The specific designs will require more detailed analysis of the existing data and probably the obtaining of additional information.

The scope of work has included the following major work items:

1. Previously available subsurface data has been assembled and reviewed for development of considerations and recommendations presented herein.

2. A supplemental subsurface exploration program consisting of 22 test borings, 22 test pits, 9 groundwater observation wells and 4 methane observation wells was developed. (BHA and BRA land) (Figure 2)

3. The subsurface exploration was carried out by Carr-Dee Test Boring & Construction Corporation under subcontract to GZD. The planning and execution of the subsurface exploration was carried out under a series of separate contracts with the Boston Housing Authority and the Boston Redevelopment Authority.

4. The field data were assimilated and geologic profiles, isopach maps and stratum contour maps were prepared (Figures 3 through 9).

5. Full time supervision of all field explorations was provided.

6. Foundation construction records for existing buildings at the site were reviewed and existing conditions were also inspected during several site visits.

7. Visits were made to adjacent sites, including the John F. Kennedy Library site, the University of Massachusetts at Columbia Point and Bayside Mall, to inspect existing building conditions and discuss foundation construction measures with personnel familiar with each site. Copies of geotechnical reports for the Kennedy Library and the University of Massachusetts of Boston were obtained and reviewed for incorporation into this report and interviews were held regarding foundation conditions at the Bayside Mall and First National Bank building.

8. Available information was reviewed and conclusions developed relative to optimum foundation packages for possible buildings to be constructed as part of the redevelopment program. Conclusions relative to probable foundation types are presented.

9. Premium foundation cost studies for various foundation schemes have been developed and are presented.

10. A geotechnical engineering report has been prepared to include descriptions of all investigations and presentation of conclusions and recommendations for planning purposes plus foundation cost studies.

1.30 ACKNOWLEDGMENTS

Several individuals and organizations were particularly helpful in providing information during development of this report. They include: Mr. David Carter - Boston Housing Authority; Mr. James Baker - Boston Redevelopment Authority; Mr. Matthew Currie - Boston Redevelopment Authority; Mr. Will Prinze - Division of Planning and Development, University of Massachusetts at Columbia Point; Mr. Charles Spaulding - Division of Physical Plant, University of Massachsetts

at Columbia Point; Mr. Robert Burke - Kennedy Library Corporation; Mr. Bill Crozier - Kennedy Library Corporation; Mr. David E. Thompson - Haley & Aldrich, Inc.

1.40 DATUM

All elevations presented in this report refer to Boston City Base Datum which is 5.65 ft above the National Geodetic Vertical Datum (N.G.V.D.).

2.00 SUBSURFACE EXPLORATIONS

2.10 GENERAL

The Columbia Point area has been thoroughly investigated over a period of many years and as a result many test borings are available, particularly those associated with the design of the Columbia Point Housing Project. Much of this work was described in a report entitled, "Sub-Soil and Site Conditions Study" by Maurice A. Reidy, dated February 17, 1964. This report, along with other available information was reviewed, and based thereon, a supplemental test boring program was developed to permit proper development of geologic profiles, isopach maps and stratum contour maps for the site, which are presented herein.

2.20 PREVIOUS TEST BORINGS

Previous test boring information reviewed include:

- 78 test borings included with the Reidy report
- 164 borings by the Raymond Concrete Pile Company for the Columbia Point Housing Development
- Summaries of soil properties for Building 120 at the University of Massachusetts Campus
- Summaries of methane well data for the Kennedy Library site
- Summaries of soil properties for the Kennedy Library site

The above information is not included with this report but is available from the Boston Housing Authority, the Kennedy Library Corporation or the University of Massachusetts, Boston Campus Planning and Development Office.

2.30 RECENT EXPLORATIONS

2.31 Test Borings

A total of 18 test borings (G-1 through G-18) were made on land administered by the Boston Redevelopment Authority (BRA) and 4 borings (G-19 through G-22) were made on land administered by the Boston Housing Authority (BHA). The location of these borings are indicated on Figure 2. The borings were performed by the Carr-Dee Test Boring & Construction Corporation during the period from December 7, 1978 through February 7, 1979. Full time inspection was provided by Goldberg, Zoino, Dunnicliff & Associates, Inc. The borings were 2½ inch diameter drive sample borings carried to depths varying from 60 ft to 204.5 ft. Table I is a summary of these recent test borings. Split spoon drive samples were obtained at 5 ft intervals or major strata change, whichever occurred first, in the soils above the thick gray clay deposits. Below a depth of 75 ft, the contractor was

allowed to sample at 20 ft intervals through the clay deposits. Groundwater observation wells were installed in 9 of the test borings and methane observation wells were installed in 4 of the borings. These observation wells were also summarized on Table I, and groundwater observations are summarized on Table III. Locations of groundwater and methane observation wells are indicated on Figure 2. Logs of the test borings prepared by the Carr-Dee Test Boring & Construction Corporation are included in Appendix A.

2.32 Test Pits

A series of 26 test pits was excavated using a rubber tired backhoe on December 20 and 22, 1978. These pits were excavated to expose fill material and to provide engineers with a better understanding of the nature of these materials. The pits varied in depth from 8 to 12 ft and are summarized in Table II. Test pit locations are indicated on Figure 2 and logs of the test pits, prepared by Goldberg, Zoino, Dunnicliff & Associates, Inc., are included in Appendix B.

2.33 Groundwater and Methane Observation Wells

As previously described, a series of 9 groundwater and 4 methane observation wells were installed in completed test borings as summarized in Table I. The groundwater observation wells consisted of 1 inch diameter slotted PVC pipe and surrounded by Ottawa sand and carried with a riser up to a protective roadway box at ground surface. Typically, the length of slotted pipe at the bottom of the groundwater observation well was 4 ft with solid pipe above that to ground surface.

The methane observation wells are similar to the groundwater observation wells except that slotted pipe was used for the full length of well to ground surface and a rubber stopper provided at the top of the well to prevent venting of any collected methane. Protective roadway boxes were also provided at the top of methane wells.

The groundwater observation wells are read by lowering an observation reader down the pipe until the water level is reached and indicated by either the response of an electric meter of the characteristic sound of a weighted tape well reader. The methane wells were read with a Heath combustible gas indicator, Model No. D-15. Readings were taken by removing the rubber stopper and inserting the intake tubing from the gas detector into the methane well and evacuating the well into the gas detector. Details of the wells are included in Appendix C. As indicated in Table III, several of

the wells can no longer be located and it is assumed that they have been destroyed either by vandals or by construction operations in the vicinity of the Kennedy Library site. The latest data were obtained on May 17, 1979 and at that time a total of 8 wells were located and read. These wells include G-6, G-7, G-9, G-12, G-17, G-19 and G-21.

3.00 SITE DESCRIPTION

3.10 GENERAL

The study area is the site of a dump formerly known as the Mile Road or Mt. Vernon Street dump. Extensive, uncontrolled dumping of refuse and burning of combustible rubbish over a period of approximately 40 years, resulted in formation of the site as it existed in 1942, with rolling topography and ground surface elevation varying between El. 14 and El. 37. A plan, prepared by Maurice A. Reidy in 1944, indicates the approximate location of the shoreline and approximate ground surface elevations over the entire Point as of 1942. Much of the fill had been placed at this time. Site topography and shorelines, prior to construction of the Columbia Point Housing Project, are indicated in a series of topographic and utility maps dated June, 1951, prepared by Henry F. Bryant & Son, Inc., Engineers. This information indicates that the site surface was rolling in hummocky typical of a dump with elevations varying from a high of approximately El. 25 to a low of approximately El. 15 adjacent to the shoreline slopes.

A water-filled lagoon approximately 400 ft by 200 ft in plan dimensions existed at the site immediately north of the present building 12. The presence of this lagoon, which was filled with water to approximately El. 8, is reflected in the depth of fill and organic silt contours shown on Figure 3. This area was apparently filled with surplus excavated material during construction of the housing project.

The grade at the east end of the site raises to a high of approximately El. 37, adjacent to the Kennedy Library site. Considerable fill and organic soils excavated from the University of Massachusetts construction activity,were placed in this area and, therefore, fill thicknesses are the greatest of anywhere on the site up to a maximum of slightly over 40 ft. Much of this area at the east end of the site was unfilled tidewaters of Dorchester Bay. During 1955, a gravel and stone dike was constructed to create a tidal pool for disposal of incinerator slag residue and other refuse which could not be processed by incineration. Disposal of refuse in the tidal lagoon continued until 1962 when legislation prohibited further filling. During 1970 and 1971 the area was filled to current grades using the materials excavated from the campus area.

3.20 SUBSURFACE CONDITIONS

Subsurface conditions at the redevelopment study area are typical of those encountered in the entire Columbia Point peninsula. The sequence of major subsurface strata from ground surface down include:

- Miscellaneous Refuse Fill
- Organic Silt and Peat
- Sand and Gravel
- Stiff to Hard Yellow Gray Clay with Lenses and Layers of Medium to Fine Sand
- Medium Stiff to Soft Gray Silty Clay with Sand Lenses and Layers throughout
- Very Dense Heterogeneous Mixture of Sand, Silt, Clay and Gravel with occasional boulders (Glacial Till)
- Bedrock (Cambridge Argillite)

Miscellaneous Fill

Fill was encountered at all locations investigated and varies from relatively clean coarse to fine sand and gravel to industrial and domestic rubbish containing bricks, ashes, bottles, oily fabric, wood, etc. The thickness of fill typically varies from 15 to 20 ft in the housing area but varies up to in excess of 25 ft in the vicinity of Boring G-7 and up to approximately 40 ft in the vicinity of Boring G-14, adjacent to the Kennedy Library site. The fill material is heterogeneous in nature and compressible and generally unsuited for support of permanent structures.

Organic Silt and Peat

Organic silt and peat was encountered in approximately half of the 22 test borings. This strata is the result of a shallow marine environment and is typically 2 to 5 ft thick. It varies from a fibrous peat to a soft dark brown to black organic silt. It is highly compressible and unsuited for support of structures. Figure 3 is a plot of the contours of the combined thickness of fill and organic silt at the site, or looked upon another way, it is a plot of the depth to natural inorganic soil which may be suitable for support of structures.

Sand and Gravel

Underlying the organic soils is a stratum of sand and gravel interbedded with silt and clay in varying amounts, which is of near shore marine origin. The stratum is typically 10 to 20 ft thick but has been reported to be as much as 47 ft thick at the Kennedy Library site. It is believed that these granular deposits were laid down by near shore streams and later reworked by means of tidal fluctuations and long shore currents. They are complexly interbedded with sand and clay and, in some areas, the transition from sand to clay is indistinct and transitional in nature.

Very Stiff to Hard Yellow Gray Clay

A thin stratum of very stiff to hard yellow gray silty clay

underlies the granular deposits described above. This stratum, which is typically 2 to 3 ft thick where encountered, is a result of a depressed sea level after deposition of major clay deposits in the Boston Basin. During a period of lowered water levels, the clay surface was exposed to drying which resulted in oxidation and, therefore, the yellow gray color. The stiff yellow gray clay is commonly relied on in the Boston area for support of shallow foundations.

Silty Gray Clay

Below the thin stratum (or drying crust) of stiff to hard yellow gray clay is a medium stiff to soft gray silty clay interbedded with layers and lenses of fine to coarse sand throughout. This deposit which is known locally as the "Boston Blue Clay" is of marine origin and typically varies in thickness at the site from approximately 60 ft to as much as 195 ft at Boring G-20. Elevation contours for the bottom of the clay deposit are plotted on Figure 4. As can be observed from the contours, the elevation to the bottom of clay varied from El. -70 in the vicinity of the Administration Building to a maximum of El. -220 in the northeast corner of the housing project (Boring G-20).

Glacial Till

The deepest and oldest soil deposit is the glacial till which mantles the bedrock in the Boston Basin area and underlies the marine clay. The till is a heterogeneous mixture of sand, silt, clay, gravel and occasional boulders. In Appendix D are typical gradation curves for the glacial till. The till is very dense and is the stratum to which end bearing deep foundations are typically carried. The total thickness of glacial till at the site is not known as bedrock was not cored in any of the test borings. Elevation contours for the glacial till surface are plotted on Figure 4.

Bedrock

Although not cored in any of the borings for the subject study, the bedrock at the Columbia Point site is known from explorations at other recent major facilities to be the Cambridge Argillite. The argillite is a gray weakly metamorphosed siltstone to mudstone which varies in quality and composition greatly over the area of the Boston Basin. The quality of the rock as observed in cores from the Kennedy Library site varied from poor highly fractured rock to massively bedded units. The argillite is of concern only for typically very high capacity deep foundation units, which are not anticipated for this project.

Figures 5 through 9 are soil profiles for the site which illustrate the relative positions of each of the major subsurface units to one another with depth. Locations of these profiles are indicated on Figure 2.

3.30 GROUNDWATER

As previously described, a series of 9 groundwater observation wells were installed at locations as indicated on Figure 2. The data from these wells are summarized in Table III. The elevation of observed water levels varies from El. 3.8 to El. 8.7, but is typically in the range of El. 6 to El. 8. It is of interest to note that the measured water level in the lagoon, which existed at the Columbia Point site prior to construction of the housing development, was El. 8.0. The maximum groundwater elevation observed at the Kennedy Library site was El. 9. Groundwater level observations were made at times of varying tide heights and it appears that they are relatively insensitive to tidal fluctuations. It is believed that the amount of tidal fluctuation of groundwater level is related to the proximity of the measurement point to the shoreline. In general, however, at probable building locations, it is unlikely that major variations in water level will be observed due to tidal influences. The Columbia Point Housing Project was constructed with crawl spaces at El. 10 and basement floor at El. 14.75 without basement or crawl space leakage problems. It is suggested that El. 12 be assumed for a conservative design water level.

3.40 METHANE

Methane, which is a combustible gas in mixtures of air between 5 and 15%, is generated due to the decomposition of organic materials in land fill areas. If allowed to accumulate in closed spaces within building areas, it can represent a major danger due to explosion or possible asphyxiation of people entering the space.

Dr. Melvin W. First and his associates describe the history of methane detection in generation at the Columbia Point Housing Project in a paper entitled, "Control of Toxic and Explosive Hazards in Buildings Erected on Land Fills", published in the Public Health reports, Vol. 81, No. 5, May 1966. Dr. First reports that considerable quantities of methane were generated and detected in building basements within the first few years after construction of the Columbia Point Housing Project, but that the concentration dropped off to imperceptible levels after a few years of construction. It was concluded that the construction of buildings and heat generated by the finished space accelerated the methane generation process to the point that the fill was completely decomposed and no additional gas was generated. A series of 4 methane wells were installed in completed borings as indicated on Figure 2, for this redevelopment study. No methane has been detected in these wells or a representative number of building basesments.

In contrast, however, some of the highest concentrations of methane, recorded in the Boston area were detected at the Kennedy Library. Concentrations as high as 86% of combustible gas were observed in wells at this site. It is hypothesized that these high gas generation rates are probably due to the recent nature of the fill as previously described.

The Phase I structures at the University of Massachusetts campus are equipped with methane control systems. Most of the structures, completed in 1973, are equipped with an active and passive protection system. The passive protection system consists of a gas impermeable membrane placed below the ground level slab. The membrane is designed to minimize gas infiltration in occupied building areas in the event the active system malfunctions. The active system consists of forced ventilation accomplished with a defuser system consisting of horizontal air supply and evacuation pipes embedded in a layer of crushed stone placed below the ground floor slab above the refuse fill. Methane is allowed to collect in the crushed stone layer, venting by natural exhaust to the atmosphere until any one of a series of below slab sensing probes detects a concentration of methane above 2.5%. The control apparatus then activates the pump which draws air into the crushed stone layer, exhausting the collected gas until the methane concentration is approximately 1%. In the event that the methane concentration becomes dangerously high with the defuser system operational, provisions are made to allow the addition of non-combustible nitrogen to reduce the oxygen concentration. It is reported that one structure at the campus does not have an active methane protection system. It has a system in which a rockfill is enclosed within a membrane and nitrogen gas introduced into the rockfill void. It is assumed that any combustible gas which reaches the rockfill will be diverted by the nitrogen-filled membrane. Any gas that enters the membrane would be rendered unexplosive due to the presence of the nitrogen.

It is reported both by Dr. First and other investigators that methane generation is highest during spring and summer months. It is, therefore, suggested that additional measurements be made during the summer months in the wells installed by GZD to check for the presence of methane as the warmer weather arrives.

Although no methane has been detected during these planning phase studies, it is recommended because of the sensitive nature of the problem and the probability that some methane will be generated at the site, that detailed investigations be made in connection with any final design of buildings within the redevelopment area. This is particularly true for any new structures built eastward of the existing housing development.

4.00 FOUNDATION STUDIES

4.10 GENERAL

Many schemes have been discussed for redevelopment of the Columbia Point Housing Project, however, no specific proposals were made for detailed consideration in this study. The studies are therefore based on the assumption of buildings having a "footprint" area of approximately 10,000 sq. ft and varying in height from 2 to 30 stories. Foundation feasibility and premium cost studies were performed over this wide range of assumed building types to provide planning information for site developers.

4.20 REQUIREMENTS FOR A SATISFACTORY FOUNDATION

A satisfactory foundation for any given structure must meet three general requirements:

1. The foundation and underlying soil must be adequately safe against a structural failure which could result in sudden and catastrophic collapse.

2. During the design life of the structure, the foundation must not settle uniformly or differentially by an amount which could damage or impair its useful function.

3. The foundation must be both technically and economically feasible to construct.

The first requirement is a function of the strength and therefore bearing capacity of the underlying soil to preclude sudden failure. The second requirement is related to the net load imposed on the soil compressibility. Provided that the settlement resulting from soil compression does not endanger the safety of the structure, tolerable settlement may be on the order of several inches, if the owner is willing some inconvenience and periodic maintenance. Modern buildings have been built in Boston in recent years which have settled up to 6 inches without impairing use of the structure. Particular attention must be paid to the possibility of differential settlement. Feasibility from both a technical and cost point of view for foundation construction is dependent upon the current state of practice in the local area. For the study, local contractors have been contacted and experiences of the firm over recent years have been incorporated into assumptions made with regard to constructibility and cost of foundations.

4.30 DEVELOPMENT ASSUMPTIONS

A detailed development program has not been adopted for the Columbia Point Redevelopment Project, however, likely schemes involve

both new construction and rehabilitation of existing structures and facilities. For the purposes of this report, it has been assumed that new buildings could consist of anything from two to thirty story structures. Existing buildings at the housing project vary from two to seven stories with one basement plus a crawl space below grade. With the exception of the Administration Building and one of the housing units in the southwest corner of the site, all buildings are supported on wood piles designed for a load of 18 tons per pile.

It has been assumed that a typical building will cover around area approximately 100 ft by 100 ft and that the building will have a basement or crawl space excavated to El. 10. The most likely structrual system for the building was assumed to be bearing walls spaced approximately 25 ft on centers spanned by precast concrete flooring elements. Steel or concrete framed buildings with columns spacing 20 to 30 ft on centers were also considered. For the purposes of this study and the accuracy of calculations, the exact structural system is not that influential on evaluation of foundation scheme feasibilities. Obviously in final design, structural schemes have to be considered in detail. The gross weight of buildings for purposes of settlement calculations and evaluation of foundation types was assumed to be 175 lbs. per sq. ft per floor.

4.40 SETTLEMENT ANALYSES

Settlement analyses were made based on assumptions presented in Section 4.30 and using soil data from nearby sites. The seat of settlement was assumed to be the deep clays which are assumed to be overconsolidated down to approximately El. -90 and normally consolidated below that level. An average recompression ratio for the overconsolidated clay of 0.025 was assumed. For the normally consolidated clay an average compression ratio of 0.205 was assumed.

Settlement calculations were performed based on the above assumptions, assuming one-dimensional consolidation. Based on these assumptions and assuming a clay thickness on the order of 150 ft, calculated settlements vary from approximately 1 inch for a six-story building up to 3 to 5 inches for a twelve-story building. It has been assumed that the maximum tolerable settlement is on the order of 4 to 5 inches and therefore any building in excess of twelve stories have been assumed to require deep foundations through the clay. A more complete discussion follows in 4.50, Feasible Foundation Types.

4.50 FEASIBLE FOUNDATION TYPES

Foundation schemes considered and described in the following sections include:

1. Excavation of unsuitable materials and replacement with compacted granular fill.

2. Creosote-treated wood piles with a design capacity of 18 tons.

3. Mandrel driven shell piles with a load capacity varying from 40 to 80 tons.

4. Pressure injected footings (Franki Pile) with a load capacity varying from 40 to 120 tons.

5. End bearing concrete filled pipe, or precast concrete piles with a load capacity varying from 100 to 120 tons.

Augered, cast-in-place caissons were considered but not felt to be a feasible foundation scheme for soil conditions encountered in the housing development area. The typical soil profile as previously described consists of fill, sometime underlain by organic soils over granular pervious soils. To properly excavate and dewater caissons would be extremely difficult because of the granular soil below the water table. Typically, caissons are used in the Boston area where unsuitable materials overly clays or other relatively impervious but competent inorganic soil. Caissons are therefore considered to be an unlikely foundation solution at the site and have not been evaluated in these studies.

4.51 Excavation and Replacement

As can be seen from Figure 3, the depth of soil unsuitable for support of buildings is typically 15 to 20 ft. The bottom of excavation would typically be at El. 0 $\pm$ 3 ft which is approximately 9 to 15 ft below groundwater level at the site. While excavation and replacement schemes are technically feasible, there are major considerations which will impact costs of construction. These include groundwater control during excavation and disposal of excavated materials. Groundwater control could be achieved by readily available means such as pumping from sumps within the excavation, deep wells or well-point systems. It would be necessary to operate dewatering systems during the excavation process and subsequent backfilling with compacted granular fill. Depending on the thickness and nature of the compacted granular fill, buildings could be constructed on it supported on spread foundations designed for bearing pressures varying from 2 to as much as 5 tons per sq. ft. In the Boston area, many three to eight-story buildings have been constructed on compacted fill and several structures as high as twenty-two stories have also been similarly supported. Placement of compacted granular fill, particularly where groundwater control is required, should be observed and tested by a qualified engineer during construction.

The second significant consideration mentioned above in connection with excavation and replacement schemes is proper disposal of excavated materials. Recent environmental laws

control the dumping of excavated fill and organic soils and it is often, therefore, necessary to haul the materials long distances for proper disposal, thereby increasing costs. The premium costs associated with groundwater control, engineering supervision and disposal of excavated materials have been considered in the premium cost studies discussed in Section 4.60

4.52 Wood Piles

Creosote-treated wood piles were used for support of most of the structures at the housing development. It is understood, based on reports of other engineers, that they were driven to a design capacity of 18 tons per pile, with cutoff at El. 7.33. Article 7 of the current Massachusetts Building Code limits the height of buildings supported on creosote-treated wood piles cut off above the water table to two stories. For piles cut off below groundwater levels, as was the case for the present housing project, there is no such building height limitation. Therefore, it is believed that new buildings in excess of two stories in height could be supported on creosote-treated wood piles cut off below the water table. A significant contingency with regard to the use of wood piles at a site which has previously been used for dumping, is the possibility of pile damage due to obstructions in the fill. Building rubble was encountered in some test pits and borings indicating that obstructions could be a problem. It is not known how much of a problem this was during the original construction, however, provisions should be made in any evaluation of wood pile foundations for removal or penetration of obstructions by other means than driving of the wood piles. The possibility of such contingency has been provided for in the premium cost studies. Wood piles function as friction piles driven through the unsuitable and organic soil into the natural granular materials and stiff clay crust underlying the natural granular deposits. Based on the available information and an assumed load capacity of 18 tons, it has been assumed that wood piles would vary in length from approximately 37 ft to 65 ft.

4.53 Mandrel Driven Shell Piles

Steel shell piles driven by a rigid mandrel and precast concrete piles can be used as friction piles of a higher capacity than is possible with wood piles because they can be driven to a greater length and are structurally stronger. The piles would function in essentially the same manner as wood piles, however for the purposes of the study it has been assumed they would be designed for a load capacity bearing from 40 tons to 80 tons per pile. To achieve these capacities it is estimated that the piles would be approximately 60 ft to 90 ft long. At the present time in the Boston area, the maximum practical limit for mandrel driven shell piles is 90 ft.

4.54 Pressure Injected Footings

The fourth feasible foundation scheme considered was pressure injected footings designed to bear in the natural granular deposits underlying fill and organic soils at the site. Pressure injected footings are comprised of a bulb of compacted dry concrete placed at the bottom of a drive tube which is then withdrawn and replaced by a concrete filled corrugated shell. In the Boston area these piles are commonly referred to as Franki piles, which is the name of a particular foundation company. However, other piles which perform on a similar principal are the TPT pile, provided by Underpinning & Foundation Constructors, Inc. of New York City and the "Bulb Pile" by Raymond Concrete Pile Co. The piles have been assumed to have design load bearing capacities varying from 40 tons to 120 tons, which for the Columbia Point site would require pile lengths varying from approximately 25 ft to a maximum of approximately 35 ft. The piles have been used extensively at the University of Massachusetts campus adjacent to the Columbia Point Housing Project.

4.55 End Bearing Piles

If high rise structures are to be considered for the Columbia Point redevelopment it may be necessary to support them on end bearing piles consisting of either concrete filled steel pipe or precast concrete piles driven through the thick clay deposit to bearing in the dense glacial till or bedrock. It has been assumed that load capacities varying from 100 tons to 120 tons can be achieved with piles of this type. To achieve these load capacities it will be necessary to have piles varying in length from approximately 90 ft to as much as 240 ft. Until recent years, the most common high capacity end bearing piles used in the Boston area were concrete filled pipe piles. However, with new developments in splicing techniques for pretensioned precast concrete piles it is now possible to field splice pretensioned precast concrete piles and therefore drive them to required depths in excess of 200 ft. End bearing piles have been used extensively under heavy structures for both the University of Massachusetts campus and the Kennedy Library.

All of the pile foundation types described above will require proper engineering observation during construction and load testing to verify design assumption. The cost for these services has not been included in the premium cost study as they are common to all pile types considered.

4.60 PREMIUM FOUNDATION COST STUDIES

A major portion of this work has been to prepare preliminary estimates of premium costs associated with various foundation schemes considered. Premium foundation costs are defined as those costs which are in excess of a building with one basement constructed on

an ideal site, i.e. one where spread foundations and earth supported basement slab are possible. In general, the Columbia Point site is not ideal and premium costs are typically comprised of the cost of structural basement slab and deep foundation units.

For the excavation and replacement scheme, the premium cost items include:

- Excess excavation cost
- Dewatering
- Placement and compaction of imported fill

The basement floor slab can be supported on the compacted fill and there is, therefore, no premium cost associated with it.

For each of the pile schemes considered, i.e. creosote-treated wood, mandrel driven shell, precast concrete, pressure injected footings and concrete filled pipe, the premium costs are comprised of:

- Pile costs
- Construction of a cast on grade structural basement slab

The premium cost studies have not included costs of providing methane protection systems. These are considered separately and are discussed in the following Section 4.70.

Assumptions made with respect to premium cost studies are summarized in Table IV. The results are tabulated in Table V and presented graphically in Figure 10.

For purposes of this discussion, low rise buildings are defined as those 4 stories or less in height, mid rise as 12 stories or less in height and high rise as 20 to 30 stories in height.

For low rise buildings, i.e. 4 stories or less, the most economical foundation type will likely be pressure injected footings. However, the cost of excavation and replacement schemes and creosote-treated wood piles may be closely competitive and, therefore, these three schemes will have to be examined carefully for selection of a final scheme. For mid rise buildings, the most favorable scheme appears to be excavation and replacement with wood piles and pressure injected footings the next most desirable. A significant contingency for excavation and replacement as previously discussed, however, is disposal of the rubbish fill and organic silt, which, if haul distances become too great, could greatly affect the cost of excavation and replacement as a probable foundation scheme. Because of contingencies associated with obstruction to driving wood piles, it is believed that the closest competition will result between pressure injected footings and excavation and replacement

schemes. For both the low and mid rise cases, mandrel driven shell or precast concrete friction pile appear to be the most expensive alternate.

For high rise buildings, i.e. those greater than 12 stories, it has been assumed that end bearing piles would be required for support, and therefore, no comparison is made with the other alternative types. With careful detailed analysis of buildings and soil properties, it could be possible to construct buildings in excess of 12 stories supported above the thick clay stratum. However, for planning purposes, it is recommended that it be assumed that end bearing piles will be required for buildings over 12 stories in height.

4.70 METHANE PROTECTION

As previously described in Section 3.40, no methane has been detected in the study area. However, very large concentrations have been detected at the site of the Kennedy Library, located to the east of the Columbia Point Housing Project. The absence of methane in recently installed wells is in agreement with studies conducted in 1966 by Dr. Melvin First and his associates and it is likely that new construction could result in renewed methane generation. Therefore, it is recommended that new construction be designed to include methane protection systems similar to those provided for new construction in the Columbia Point area over the past 10 years. The premium costs associated with these systems include:

- Over excavation to permit placement of crushed stone beneath slabs
- Placement of ventilation piping within the crushed stone beds
- Methane detection equipment
- Forced ventilation systems equipment, i.e. exhaust pumps

Systems of this type were apparently not installed with the original construction at Columbia Point. However, during the early years of occupancy, it has been reported that dangerously high methane concentrations built up in crawl spaces below the basement slab such that permanent ventilation systems had to be installed to exhaust the combustible gases from these spaces. After a period of approximately 5 years, little or no additional methane generation was reported. To summarize, positive methane collection and exhaust facilities must be provided beneath new construction to protect buildings against build up of potentially explosive concentrations of methane.

5.00 SITE DEVELOPMENT STUDIES

5.10 GENERAL

The nature of the Columbia Point site requires that careful consideration be given to site development provisions. Sites containing rubbish fill overlying organic deposits are highly susceptible to long term continuing subsidence which tends to be linear with the logarithm of time. Zoino (1971) reports C_α values varying from approximately 0.01 to 0.04 with a reported value for the Columbia Point Housing Project of 0.021 ± 0.003. C_α is the slope of the log-time compression curve expressed as strain, i.e. between years 1 and 10 after the start of secondary compression approximately 3 to 6 inches of settlement could occur. Similar settlement is to be expected between the 10th and 100th years. Assuming that the fill at Columbia Point is approximately 30 to 40 years old, an additional 1 to 3 inches of surface subsidence can be expected over the next 50 years provided that no significant changes in grade are constructed. To the east of the housing project where fill has been placed within the last 10 years, larger long term subsidence should be anticipated.

Compression of the fill and organic soils affects building foundations because downward movement relative to piles supported in the underlying natural inorganic soils imparts a down drag load on the pile due to friction. This down drag reduces the available pile capacity for structural support and therefore results in increased foundation cost. If properly accounted for in design, compression of the shallow fill should not adversely affect buildings except for differential movement at entrances and aesthetic considerations immediately adjacent to buildings.

Since construction of the housing project, there has been a general site subsidence on the order of one foot. Obvious differential settlement between pavements and buildings on the order of 6 to 12 inches is common throughout the site. The site settlement has resulted in pronounced humps in roadways where roadways have settled adjacent to pile supported utilities.

A large dish-shaped settlement area is apparent in the parking area located to the east of the power plant. This is an area of deepest fill in the immediate housing project area and is also coincident with a lagoon which existed prior to housing construction. It is understood that the lagoon was filled during project construction.

5.20 UTILITIES

It is understood that original construction at the Columbia Point Project called for complete excavation of fill and organic

soils in roadway areas and replacement with slag and granular fill. The granular fill, which was approximately 6 ft thick, was placed over the slag. Storm and sanitary sewers were constructed in the slag fill and other services constructed in the upper granular materials. Outside of roadway areas, all fill was removed, but all organics were not removed in all areas. This design approach was intended to eliminate all significant settlement, but was not fully successful as is evidenced by the obvious large settlements, i.e. 6 to 12 inches, previously described. Although it is not known for sure, it appears likely that excavations were not fully dewatered and therefore inspection to see that unsuitable materials were fully removed was probably difficult, if not impossible. Fill was probably placed under water on soft unstable soils which may have also contributed to settlement.

Construction of new, major utilities at the University of Massachusetts and Kennedy Library has generally been achieved without the need for complete excavation of unsuitable materials and replacement with compacted granular fill. The type of support varies depending on the type of utility and its sensitivity to grade change or differential settlement.

In general, it is believed that utilities will not require pile support. Placement of surcharges along utility alignments for periods on the order of 1 to 2 months and construction within the existing fill materials will be adequate. Post construction settlements should not be particularly troublesome, however detailed studies will be required. A compacted gravel fill beneath and around pipes will probably be necessary for proper local support and bedding of pipes. Preloading has been used successfully at the Kennedy Library site. It may be possible to construct certain utilities such as electric lines with no surcharge. In general, such services can tolerate settlement yet continue to operate properly. Care must be taken to provide flexibility at points of utility entrance into structures. Grade sensitive utilities such as gravity sewers should be designed with sufficient grades to tolerate estimated settlement yet continue to function properly.

Major utilities could require pile support, but care should be taken to keep such facilities out of paved areas to prevent the formation of humps similar to those that presently exist at the housing project.

Utility lines beneath structural ground floor slabs should be hung from the slab.

5.30 PAVEMENTS

It is understood that the redevelopment construction may include both primary and secondary roadways plus parking areas. Original construction within the housing development called for

the complete removal of rubbish fill under roadways. Upon removal, the roadway areas were backfilled with slag up to within approximately 7 to 8 ft below finished grade and the remaining portion filled with granular fill, i.e. gravelly sand. This design concept represents a conservative approach to pavement design and in general performed satisfactorily except for problems associated with pavement over pile supported utilities. In such areas deep seated settlement, as well as compression of fill materials, has resulted in humps in roadways over the pile supported facilities. As discussed in Section 5.20, Utilities, it is probable that these roadway settlements have resulted due to incomplete excavation of all fill and organic soils plus densification of granular fill placed under water. Borings G-19 through G-22, which were made in paved areas, confirm that fill and organic soils are present under paved areas, and where present the fill is loose.

Roadway construction at Columbia Point for the University of Massachusetts has included both complete excavation of fill and organic soils as well as construction over existing fill. It is understood that the main entrance roadway to the University was fully excavated and replaced with inorganic soil. Other secondary roads and parking lots have been constructed over the rubbish fill. It is understood that pavements to be constructed for the Kennedy Library will be constructed over existing fill which will be surcharged.

It is recommended that new pavements to be constructed as part of the redevelopment program be supported on a 3 to 4 ft thick compacted gravel fill overlying surcharged fill. A 5 to 8 ft high surcharge left in place for up to 6 months will probably suffice. The exact height and duration of surcharge will depend on the nature of the roadway and underlying materials. All surcharges should be monitored for determination of time settlement characteristics. The decision for surcharge removal should be based on these data.

The development of occasional pavement depressions or "bird baths" should be anticipated no matter what construction procedures are followed with associated maintenance costs.

5.40 GRADING

Significant increased in exterior grades should be minimized. Any grade increase will result in additional settlement. Ground surface elevations in the housing area typically vary between El. 17 and El. 19, which are above the highest tide of record in Boston Harbor (El. 15.95 on February 7, 1978). Depending on location in the area, a raise in grade of 1 ft could result in settlements on the order of 3 to 6 inches within a few months after fill placement with long term settlement continuing for many years thereafter, similar to that experienced to date. If grade raises are desirable for architectural reasons, the fill materials should not be placed close, i.e. within 30 to 40 ft, of buildings in order to minimize possible down drag on piles.

5.50 SHORE PROTECTION

The need for shore protection from the Kennedy Library site westward is obvious. Shoreline erosion from storms of the 1978-1979 winter alone severely damaged the site perimeter road to the point it is impassable by vehicle. Major shore protection facilities in the form of placed riprap have been provided at the Kennedy Library and University of Massachusetts sites. These shorelines are not developed for recreational purposes except for floats to provide recreational boating access.

It is understood that the redevelopment program may include development of beaches and recreational boating facilities. If this plan is pursued, shore protection in the form of breakwater or groins will probably be necessary. In Draft Report dated January 1977, to the Boston Redevelopment Authority, the Corps of Engineers discuss shore front development. They conclude that beach development is feasible, but would require excavation of silt and organic soils for a large distance off shore. A beach slope of varying from 1 vertical to 10 horizontal to 20 horizontal with a 100 ft wide berm is suggested as workable. Off shore explorations will be required to determine the amount of required excavation and sand replacement necessary. Schematic illustrations of beach, riprap and groin details are presented in Figure 11.

TABLES

COLUMBIA POINT REDEVELOPMENT PROGRAM

BOSTON, MASSACHUSETTS

TABLE I

SUMMARY OF RECENT TEST BORINGS

Boring No.	Depth (FT)	Surface El.	Remarks
G1	174.0	17.3	-OW @ 25'
G2	60.0	17.4	-
G3	204.5	17.4	-
G4	60.0	16.5	-
G5	201.0	16.8	-OW @ 22'
G6	60.0	18.3	-OW @ 10'
G7	60.0	18.0	-OW @ 33'
G8	60.0	17.9	-MW @ 10'
G9	60.0	18.7	-OW @ 30'
G10	195.0	19.0	
G11	141.7	18.2	-OW @ 29'
G12	60.0	17.7	-MW @ 10'
G13	190.0	17.4	-MW @ 16'
G14A	163.0	30.6	-MW @ 29'
G15	60.0	17.3	-
G16	65.0	34.1	-
G17	194.0	36.7	-OW @ 45'
G18	60.0	25.1	
G19		17.0	-OW @ 28'
G20		17.4	
G21		17.0	-OW @ 21.5'
G22		16.7	

COLUMBIA POINT REDEVELOPMENT PROGRAM

BOSTON, MASSACHUSETTS

TABLE II

SUMMARY OF RECENT TEST PITS

Test Pit No.	Depth (FT)	Remarks
TP-1	10.0	6' fill over sand
TP-2	12.0	All fill
TP-3	10.0	" "
TP-4	10.0	" "
TP-5	11.0	" "
TP-6	12.0	" "
TP-7	10.0	" "
TP-8	8.0	" " (rubble)
TP-9	10.0	" "
TP-10	10.0	" "
TP-11	10.0	" "
TP-12	10.0	8' fill over organics
TP-13	8.0	All fill
TP-14	11.0	10' fill over sand
TP-15	10.0	All fill
TP-16	10.0	" "
TP-17	10.0	" "
TP-18	10.0	" "
TP-19	10.0	" "
TP-20	11.5	10' fill over silt
TP-21	10.0	8' fill over organics
TP-22	11.5	All fill
TP-23	11.0	" "
TP-24	12.0	10' fill over sand
TP-25	10.5	9' fill over organics
TP-26	10.0	7.5' fill over organics

COLUMBIA POINT REDEVELOPMENT PROGRAM

BOSTON, MASSACHUSETTS

TABLE III

SUMMARY OF GROUNDWATER OBSERVATIONS

Well No.	Surface El.	Date	Water El.	Remarks
G1	17.3	12/10/78 12/19/78 1/4/79 1/15/79 1/16/79		Installed
G5	16.8	12/19/78 1/20/79	7.6	Installed Destroyed
G6	18.3	12/13/78 12/14/78 12/19/78 1/4/79 1/24/79 2/2/79 4/10/79	7.4 7.4 3.8 3.8 6.2 6.8 4.2	Installed High tide Low tide Low tide
G7	18.0	12/14/78 12/19/78 1/4/79 1/24/79 2/2/79 4/10/79	6.9 5.6 5.8 8.0 8.4 7.0	Installed Low tide Low tide Low tide - -
G9	18.7	12/19/78 1/4/79 1/5/79 1/16/79 4/10/79	-4.1 4.9 5.6 6.1 6.1	Installed Low tide Low tide - -
G11	18.2	1/16/79 2/79	8.7 -	Installed Destroyed
G17	36.7	1/2/79 1/4/79 2/79	6.7 7.2 -	Installed Low tide Destroyed

Table III - Continued

Well No.	Surface El.	Date	Water El.	Remarks
G19	17.0	1/22/79	6.6	Installed
		1/31/79	7.6	
		2/2/79	6.8	-
		2/6/79	6.5	
		4/10/79	4.7	
G21	17.0	1/31/79	7.5	Installed
		2/2/79	7.3	-
		2/6/79	5.5	-
		4/10/79	6.0	-

COLUMBIA POINT REDEVELOPMENT STUDY

BOSTON, MASSACHUSETTS

TABLE IV

SUMMARY OF FOUNDATION

PREMIUM COST STUDY PARAMETERS

FOUNDATION SCHEME	NOTES
1. Excavation and replacement	1. Fill thickness varies from 12 ft to 28' 2. Groundwater @ El. 8± 3. Unit prices - Excavation $6.00/c.y. - Replacement $7.00/c.y. - Dewatering per 100 ft + 100 ft building - $28,000 minimum $60,000 maximum 4. Ground supported basement slab
2. Creosote Treated Wood Piles	1. Load capacity: 18T. 2. Length: 37 ft minimum 65 ft maximum 3. Structural basement slab 4. Pile unit prices: $6.00/l.f. minimum $9.00/l.f. maximum 5. Basement slab premium unit price: $2.50/S.F.
3. Mandrel driven shell or pre-cast concrete friction piles.	1. Load capacity: 40T to 80T 2. Length: 60 ft minimum 90 ft maximum 3. Pile unit prices: $12.00/l.f. minimum $20.00/l.f. maximum 4. Same basement slab system as for wood piles.

Table IV - Continued

FOUNDATION SCHEME	NOTES
4. Pressure injected footings (Franki piles)	1. Load capacity: 40T to 120T 2. Length: 25 ft minimum 35 ft maximum 3. Pile unit prices: $500/pile minimum $800/pile maximum 4. Same basement slab system as for wood piles
5. End bearing concrete filled pipe or precast concrete piles	1. Load capacity: 100T to 120T 2. Length: 90 ft to 240 ft 3. Pile unit prices: $17.00/l.f. minimum $20.00/l.f. maximum 4. Same basement slab system as for wood piles

COLUMBIA POINT REDEVELOPMENT STUDY

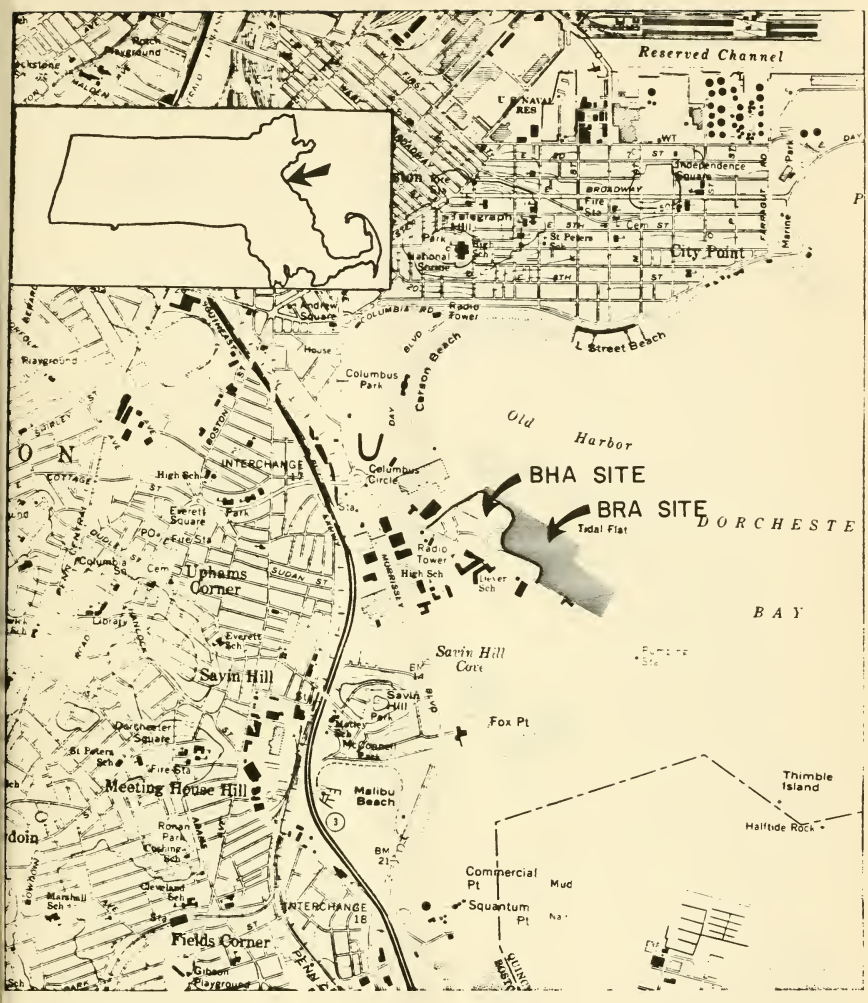
BOSTON, MASSACHUSETTS

TABLE V

SUMMARY OF FOUNDATION PREMIUM COST STUDIES

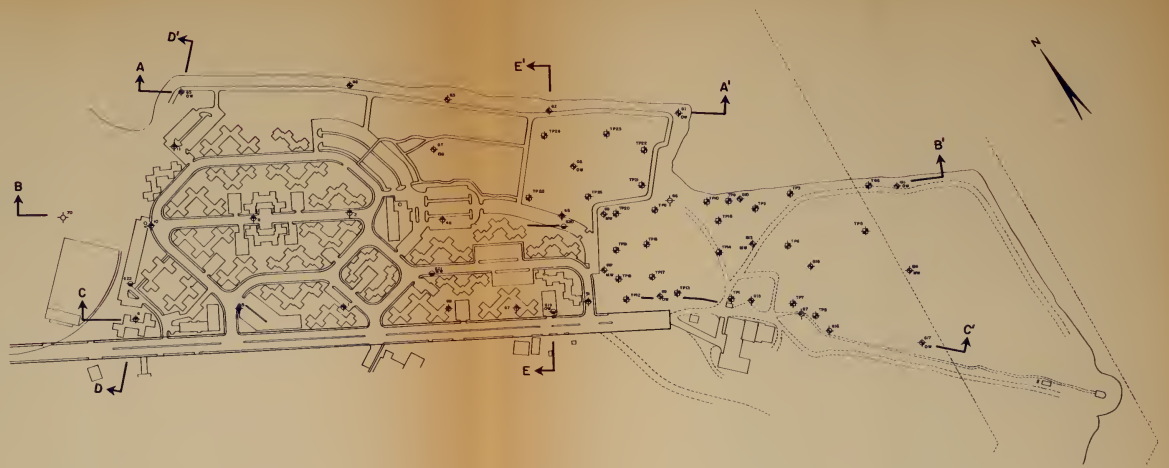
Foundation Scheme	Building Height (Floors)	Premium Foundation Costs ($/SF/Floor) Minimum	Maximum
Excavate and Replace	2	4.42	10.37
	4	2.21	5.19
	8	1.10	2.59
	12	0.55	1.73
Creosote Treated Wood Piles (18T capacity)	2	3.27	6.57
	4	2.31	5.07
	8	1.82	4.32
	12	1.67	4.06
Pressure Injected Footings (PIF) (Franki Piles) (40T to 120T capacity)	2	2.20 to 2.30	2.33 to 3.71
	4	1.43 to 2.34	1.55 to 2.68
	8	1.05 to 1.82	1.18 to 2.15
	12	0.90 to 1.69	1.00 to 1.98
Mandrel Driven Shell or pre-cast concrete friction piles (40T to 80T capacity)	2	4.22 to 5.26	6.35 to 7.03
	4	3.08 to 3.97	4.84 to 4.81
	8	2.51 to 3.35	4.18 to 4.78
	12	2.34 to 3.08	3.86 to 4.14
End Bearing Concrete Filled Pipe or Pre-cast Concrete Piles (80T to 120T capacity)	12	1.73 to 2.48	4.97 to 7.33
	20	1.59 to 2.32	4.73 to 7.01
	30	1.53 to 2.25	4.61 to 6.87

FIGURES



COLUMBIA POINT REDEVELOPMENT BOSTON, MASS.	LOCUS PLAN
	MAY 1979 FIGURE 1

GEOTECHNICAL CONSULTANTS



LEGEND

- 2-1/2" Ø TEST BORING BY CARR-DEE TEST BORING & CONSTRUCTION CORP - DEC 1978 THROUGH JAN 1979
- 2-1/2" Ø TEST BORING BY CARR-DEE TEST BORING & CONSTRUCTION CORP - JAN 1979 THROUGH FEB 1979.
- gw DENOTES GROUNDWATER OBSERVATION WELL INSTALLED
- mw DENOTES METHANE OBSERVATION WELL INSTALLED.
- MACHINE EXCAVATED TEST PIT JAN 1979.
- TEST BORING BY RAYMOND CONCRETE PILE CO., 1950-1951.
- TEST BORING, 1947 DRILLER UNKNOWN
- TEST BORING, 1920 DRILLER UNKNOWN
- LOCATION OF SOIL PROFILE

NOTES

1) TEST BORINGS G1 THROUGH G18 PERFORMED ON BOSTON REDEVELOPMENT AUTHORITY (BRA) LAND
2) TEST BORING G19 THROUGH G22 PERFORMED ON BOSTON HOUSING AUTHORITY (BHA) LAND
3) TEST BORING LOCATIONS BASED ON TAPED MEASUREMENT TO EXISTING PHYSICAL FEATURES.
4) TEST PITS TP-1 THROUGH TP-26 EXCAVATED ON BRA LAND
5) LOCATIONS OF BORINGS DRILLED PRIOR TO 1978 PROVIDED TO GOLDBERG, ZOINO, DUNNCLIFF & ASSOC., INC FROM BHA AND BRA RECORDS
6) ELEVATIONS REFERENCED TO BOSTON CITY BASE.

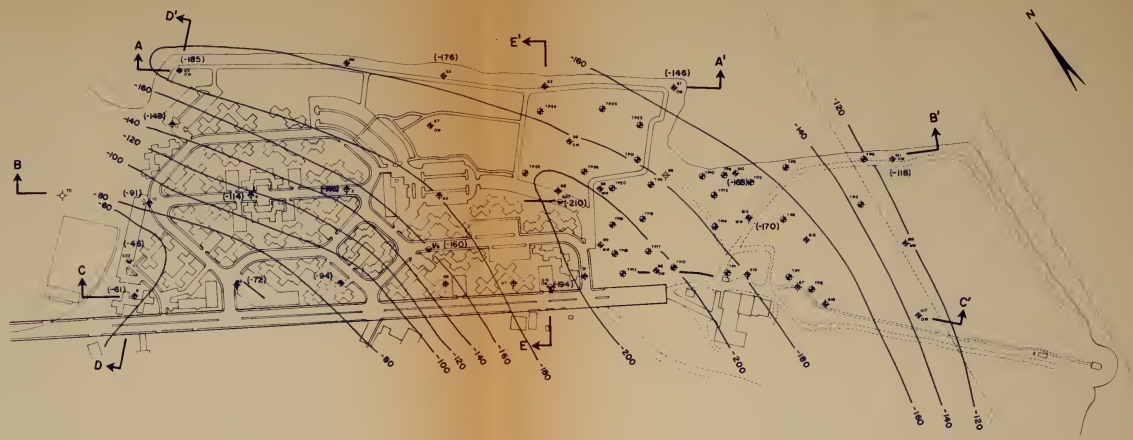
- SCALE -
0 100 200 400 600 feet

GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

SUBSURFACE EXPLORATIONS LOCATION PLAN

MAY 1979 SCALE: 1"=200' FIG. 2



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- mw DENOTES METHANE OBSERVATION WELL INSTALLED
- MACHINE EXCAVATED TEST PIT JAN 1979
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3) TEST BORING LOCATIONS BASED ON TAPED MEASUREMENT TO EXISTING PHYSICAL FEATURES

4) TEST PITS TP-1 THROUGH TP-26 EXCAVATED ON BRA LAND

5) LOCATIONS OF BORINGS DRILLED PRIOR TO 1978 PROVIDED TO GOLDBERG, ZOINO, DUNNCLIFF & ASSOC., INC FROM BHA AND BRA RECORDS

6) ELEVATIONS REFERENCED TO BOSTON CITY BASE

7) NUMBERS IN PARENTHESES, i.e (-185), ARE ELEVATION OF GLACIAL TILL SURFACE

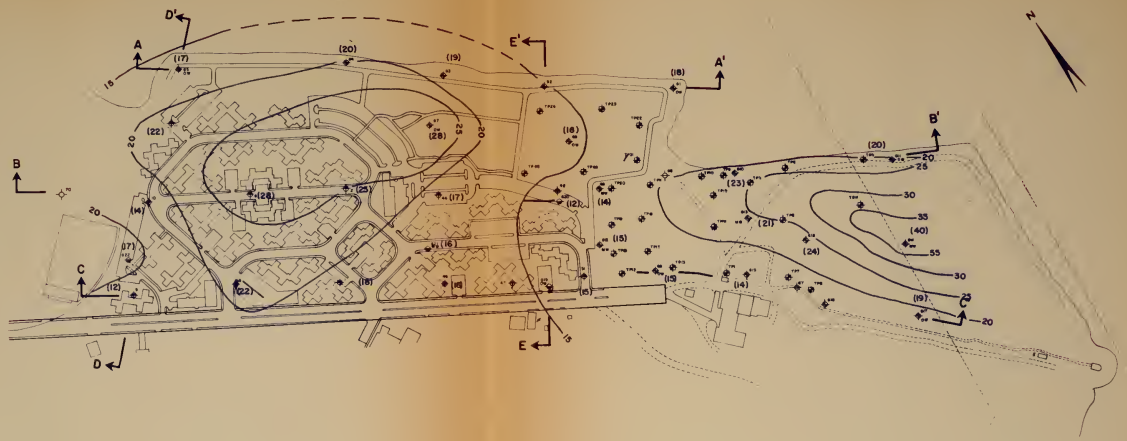
- SCALE -
0 100 200 400 600 feet

GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

ELEVATION OF GLACIAL TILL

MAY 1979 SCALE 1"=200' FIG.3



LEGEND

- 2-1/2" Ø TEST BORING BY CARR-DEE TEST BORING & CONSTRUCTION CORP - DEC 1978 THROUGH JAN 1979
- 2-1/2" Ø TEST BORING BY CARR-DEE TEST BORING & CONSTRUCTION CORP - JAN 1979 THROUGH FEB 1979
- gw — DENOTES GROUNDWATER OBSERVATION WELL INSTALLED
- mw — DENOTES METHANE OBSERVATION WELL INSTALLED
- TP-1 — MACHINE EXCAVATED TEST PIT JAN 1979
- TEST BORING BY RAYMOND CONCRETE PILE CO, 1950-1951
- TEST BORING, 1947 DRILLER UNKNOWN
- TEST BORING, 1920 DRILLER UNKNOWN
- LOCATION OF SOIL PROFILE

NOTES

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2) TEST BORING G19 THROUGH G22 PERFORMED ON BOSTON HOUSING AUTHORITY (BHA) LAND

3) TEST BORING LOCATIONS BASED ON TAPED MEASUREMENT TO EXISTING PHYSICAL FEATURES

4) TEST PITS TP-1 THROUGH TP-26 EXCAVATED ON BRA LAND

5) LOCATIONS OF BORINGS DRILLED PRIOR TO 1978 PROVIDED TO GOLDBERG, ZOND, DUNNCLIFF & ASSOC, INC FROM BHA AND BRA RECORDS

6) ELEVATIONS REFERENCED TO BOSTON CITY BASE

7) NUMBERS IN PARENTHESES, i.e. (19), ARE DEPTH IN FEET OF FILL AND ORGANIC SILT.

- SCALE -
0 100 200 400 800 feet

GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

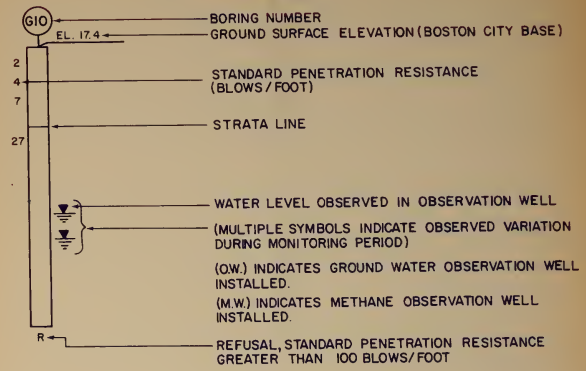
DEPTH OF FILL AND ORGANIC SILT

MAY 1979 SCALE 1"=200' FIG 4

MAJOR SUBSURFACE STRATA

SYMBOL	LOG SYMBOL	GENERALIZED DESCRIPTION
A		MISCELLANEOUS RUBBISH FILL INCLUDING SAND, GRAVEL, BRICK, WOOD, PAPER, RUBBER, GLASS, METAL, RUBBLE, etc.
B		SOFT DARK BROWN TO BLACK ORGANIC SILT.
C		MEDIUM DENSE TO DENSE GRAY BROWN SAND & GRAVEL INTERBEDDED WITH SILT AND CLAY.
D		VERY STIFF TO HARD, GRAY CLAY.
E		SOFT TO MEDIUM STIFF, GRAY SILTY CLAY INTERBEDDED WITH LAYERS AND LENSES OF FINE TO COARSE SAND.
F		DENSE TO VERY DENSE GRAY FINE TO COARSE SAND & GRAVEL, SOME CLAYEY SILT (GLACIAL TILL).

LEGEND



NOTES

1) STRATA LINES REPRESENT INFERRED BOUNDARIES BETWEEN SOIL TYPES WHICH MAY BE TRANSITIONAL IN NATURE AND THEREFORE NOT CORRESPOND EXACTLY WITH INDICATED BOUNDARIES.

2) INDICATED GROUNDWATER LEVELS ARE LIKELY TO VARY WITH SEASONAL AND TIDAL VARIATIONS.

3) REFER TO FIGURE 2 FOR SOIL PROFILE LOCATIONS.

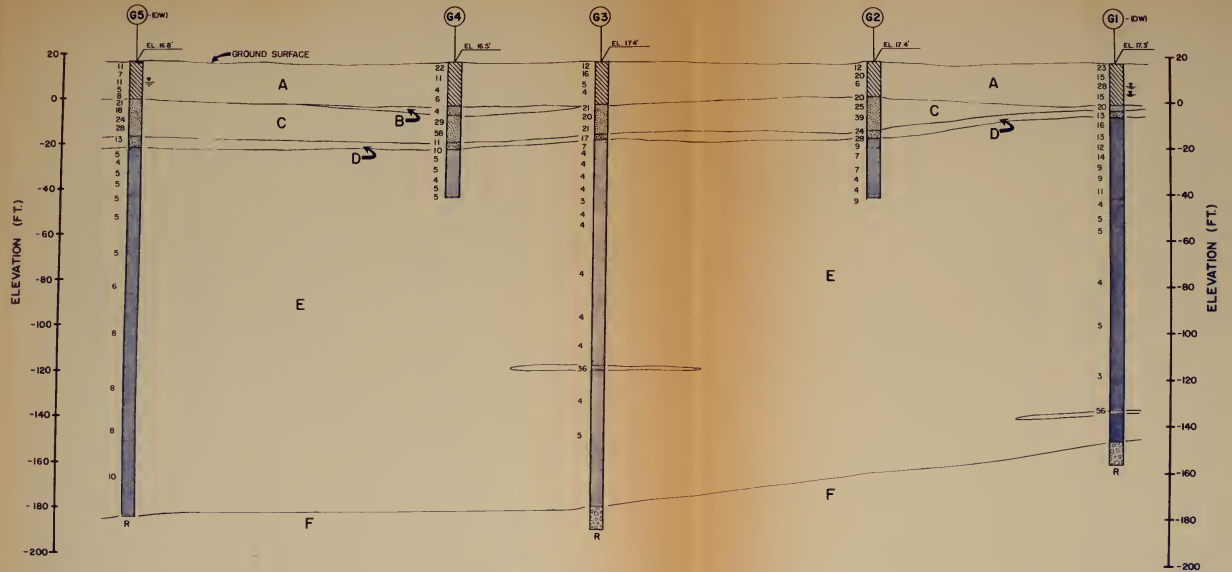
FILE No.

GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

SOIL PROFILE
LEGEND & NOTES

MAY 1979 FIG. 5



SECTION A-A'

NOTE: REFER TO FIGURE 5
FOR LEGEND AND NOTES.

REFER TO FIGURE 2
FOR PROFILE LOCATIONS.

- SCALE -

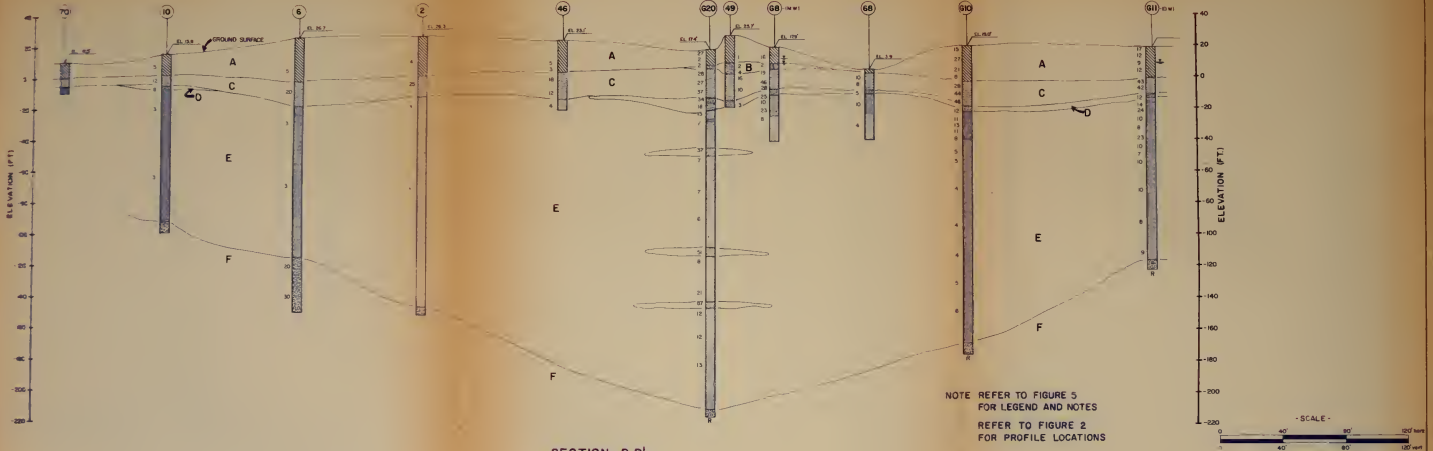
0' 40' 80' 120' horz.
0' 40' 80' 120' vert.

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

SOIL PROFILE A-A'

MAY 1979

FIG. 6

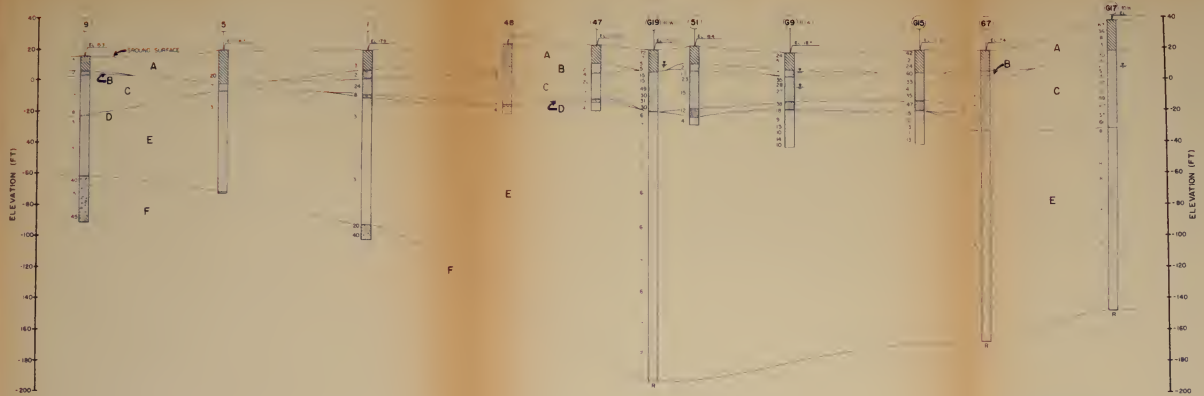


SECTION B-B'

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

SOIL PROFILE B-B'

MAY 1979 FIG. 7



SECTION C C'

NOTE REFER TO FIGURE 5
FOR LEGEND AND NOTES.

REFER TO FIGURE 2
FOR PROFILE LOCATIONS

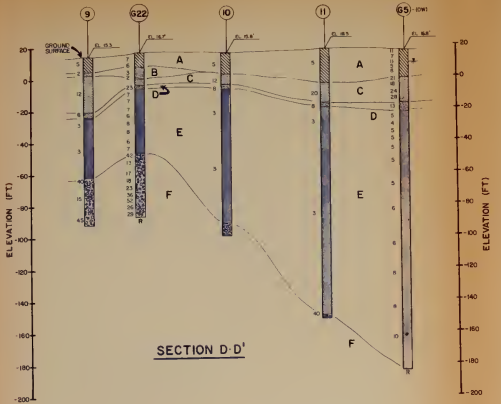
SCALE

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS

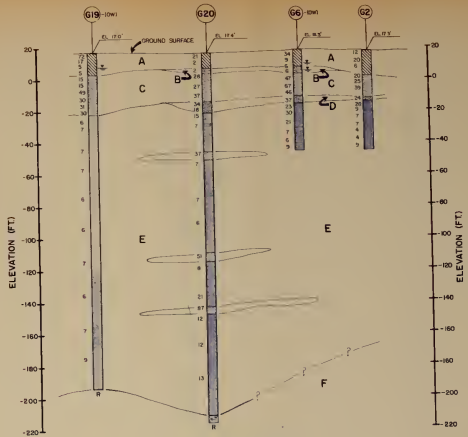
SOIL PROFILE C-C'

MAY 1979

FIG 8



SECTION D-D'



SECTION E-E'

NOTE: REFER TO FIGURE 5 FOR LEGEND AND NOTES.

REFER TO FIGURE 2 FOR PROFILE LOCATIONS.

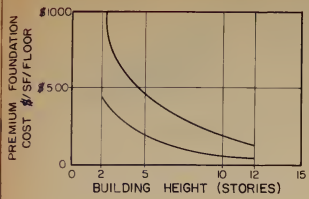
- SCALE -

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

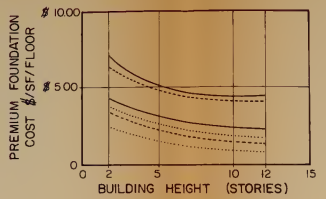
SOIL PROFILES D-D' & E-E'

MAY 1979

FIG. 9

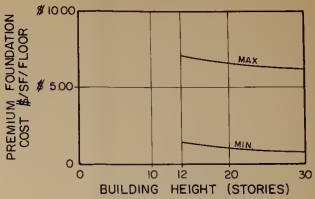


EXCAVATE & REPLACE



SHALLOW PILES

——— WOOD PILES (65 ft. max.)
..... PRESSURE INJECTED FOOTINGS (35 ft. max.)
- - - - - MANDREL DRIVEN SHELL PILES (90 ft. max.)



DEEP PILES DRIVEN THROUGH THE CLAY

(CONCRETE FILLED PIPE OR PRE-CAST CONCRETE 240 ft. max.)

NOTES

1) REFER TO TABLE IV FOR SUMMARY OF FOUNDATION PREMIUM COST PARAMETERS.
2) REFER TO TABLE V FOR TABULAR SUMMARY OF FOUNDATION PREMIUM COSTS.

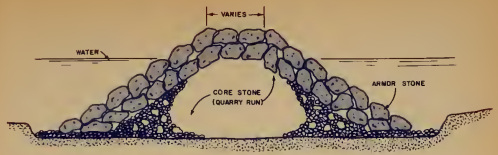
FILE No. 2217

GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

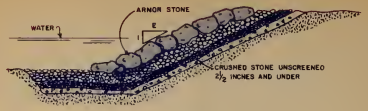
PREMIUM FOUNDATION COST STUDIES

MAY 1979 FIG. 10



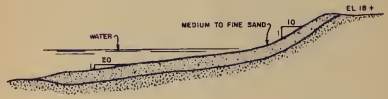
RUBBLE MOUND GROIN

(NTS)



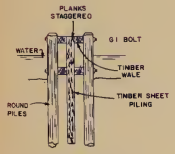
RIP RAP SHORE PROTECTION

(NTS)

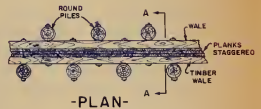


BEACH SECTION

(NTS)



-SECTION A-A-



-PLAN-

TIMBER SHEET PILE GROIN

(NTS)

GENERAL NOTES

1) DIMENSIONS AND DETAILS OF SHORE PROTECTION TO BE DETERMINED BY SPECIFIC SITE CONDITIONS.

2) NOT FOR DESIGN.

FILE No

GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

SHORE PROTECTION SCHEMATICS

MAY 1979

FIG 11

APPENDIX A

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION

37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNIGLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78279

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-1

GROUND SURFACE ELEV. 17.31

	6 9 14 11	S#1
SAND, GRAVEL, STONES, TRACE CINDERS, ASHES, BRICK FILL	5 6 9 5	S#2
	15 14 14 15	S#3
10" SAND, GRAVEL, LITTLE CINDERS, WOOD FILL	6 7 8 7	S#4
10" VERY STIFF YELLOW CLAY, SOME FINE SAND, TRACE OF INORGANIC SILT	9 10 10 11	S#5
10"		
STIFF BLUE CLAY, VEINS OF FINE SAND	7 7 6 6 5 7 9 9	S#6 S#7
	4 6 7 7	S#8
10"		

CONTINUED NEXT COLUMN

BORING #G-1 (CONTINUED)

32'10"		
STIFF BLUE CLAY, VEINS OF FINE SAND	5 5 7 7	S#9
	6 9 5 5	S#10
	3 4 5 4	S#11
	4 4 5 10	S#12
	3 5 6 5	S#13
59'10"		
BLUE CLAY, VEINS OF FINE SAND SOFT	3 2 2 2	S#14
63'10"		

CONTINUED NEXT SHEET

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive 2"O-INCH SPLIT SAMPLER 0 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION

37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (CZT FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-1 (CONTINUED)

3'0"

MEDIUM 3 3 2 2 S#15

MEDIUM 2 3 2 2 S#16

BLUE

CLAY,

VEINS OF

FINE SAND

SOFT 2 2 2 2 S#17

3'0"

CONTINUED NEXT COLUMN

BORING #G-1 (CONTINUED)

93'0"

BLUE

CLAY,

VEINS OF

FINE

SAND

MEDIUM 2 3 2 2 S#

112'0"

CONTINUED NEXT SHEET

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive TWO-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION
37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-1 (CONTINUED)

2'0"

BLUE

CLAY,

VEIN

OF

FINE

SAND

SOFT 2 1 2 2 S#19

CONTINUED NEXT COLUMN

BORING #G-1 (CONTINUED)

132'0"

BLUE

CLAY,

VEIN

OF

FINE

SAND

150'0"

SAND, GRAVEL & CLAY 30 26 S#21

151'0"

9 12 S#20

MEDIUM

DENSE

FINE SAND

& CLAY

164'0"

CONTINUED NEXT SHEET

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive TWO-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb weight falling 24 inches ±

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-1 (CONTINUED)

40'0"		
	45	S#21
VERY DENSE	42	
	44	
	43	
SHALE, FINE SAND,	46	
	44	
	48	
LITTLE	54	
	60	
	50	
GRAVEL	51	
	53	
	53	
	56	
	55	
	57	
	58	
41'0"	59	

REFUSAL - NOT ENCOUNTERED

WATER LEVEL - TIDE
SIZE OF CASING 3", LENGTH 20'0"
NUMBER OF DRIVE SAMPLES (S), 22
DATE STARTED 12-13-79, DATE COMPLETED 12-15-79
DRILLER: E. DESIMONE, INSPECTOR: G. MATHEWS
OBSERVATION WELL INSTALLED 25'0" BELOW GROUND SURFACE

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive TWO-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (OZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-2

GROUND SURFACE ELEV. 17.39

	LOAMY SAND, LITTLE GRAVEL FILL	2 4 8 10	S#1
'6"			
		10	
	SAND, TRACE	12	S#2
	GRAVEL, ORGANIC	8	
	SILT FILL	7	
		2	
		2	
		4	S#3
		5	
0"	LOAMY SAND, SOME GRAVEL,	5	
0"	TRACE OF FIBRES	11	S#4
	MEDIUM DENSE MEDIUM SAND,	19	
	SOME COARSE SAND,	27	S#4A
0"	& GRAVEL		
	MEDIUM	15	
		12	S#5
	DENSE MEDIUM	13	
	SAND, SOME COARSE SAND	16	
	& GRAVEL		
0"			
		10	
	DENSE	15	S#6
	MEDIUM SAND,	24	
	LITTLE COARSE	22	
	SAND & GRAVEL		
0"			
	VERY STIFF	5	
	BLUE CLAY	7	S#7
5"		17	
0"	MED. DENSE FINE SAND, CLAY	14	S#7A

CONTINUED NEXT COLUMN

BORING #G-2 (CONTINUED)

32'0"	STIFF		
	BLUE CLAY,		
	VEINS OF FINE	6	
	SAND	4	S#8
		5	
		6	
38'0"	MEDIUM		
	BLUE CLAY,	5	
	TRACE FINE SAND	4	S.
		3	
		4	
44'0"	MEDIUM		
	BLUE	3	
		3	S#1
	CLAY	4	
48'6"		3	
	SOFT	2	S#11
	BLUE	2	
	CLAY	3	
		2	
		2	S#1
		2	
		3	
58'0"		3	
	STIFF BLUE CLAY	4	S#1
60'0"		4	

REFUSAL -NOT ENCOUNTERED

WATER LEVEL 12'6" (TIDE) 2:45 PM, 12-7-78
SIZE OF CASING 2-1/2", LENGTH 35'0"
NUMBER OF DRIVE SAMPLES (S), 15
DATE STARTED & COMPLETED 12-7-79
DRILLER: S. DESIMONE, INSPECTOR: G. MATHEWS

If samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels Figures in right hand column indicate number of blows required to drive 2-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION

37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEB. 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft

BORING #G-3

GROUND SURFACE ELEV. 17.41

0"	SAND, GRAV. WOOD, BRICK FILL	2	S#1
		4	
		4	
		5	S#2
	CLAY,	7	
	SOME SAND,	8	
	GRAVEL, LITTLE		
	BRICK		
	FILL	5	S#3
		7	
		9	
6"		7	
	BLUE	2	
		2	S#4
	CLAY, LITTLE	3	
	SAND, TRACE OF BRICK,	3	
	WOOD		
	FILL	2	S#5
		2	
		2	
0"		2	
	MEDIUM		
		8	
		9	S#6
	DENSE, COARSE	12	
		11	
	SAND		
		9	
		9	S#7
		11	
		11	
0"			
	DENSE	1	
	MEDIUM SAND, LITTLE	1	S#8
	COARSE SAND	2	
0"		2	

CONTINUED NEXT COLUMN

BORING #G-3 (CONTINUED)

31'0"	VERY STIFF	13	S#9
	YELLOW CLAY, TRACE OF	14	
33'0"	FINE SAND		
	MEDIUM	3	
		3	S#10
		4	
		4	
	BLUE		
	SOFT	2	
		2	S#11
	CLAY,	2	
		3	
	VEINS		
	SOFT	1	
	OF	2	S#12
		2	
		2	
	FINE		
	SAND		
	SOFT	1	
		2	S#13
		2	
		2	
	SOFT	1	
		2	S#14
		2	
		2	
	SOFT	1	
		1	S#15
		2	
62'0"		2	

CONTINUED NEXT SHEET

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive TWO-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION
37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEB. 5, 1979 Job No. 76Z75

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-3 (CONTINUED)

92'0"			
	BLUE CLAY, VEIN OF FINE SAND		
	SOFT	2 2 2 3	S#18
112'0"			

CONTINUED NEXT SHEET

BORING #G-3 (CONTINUED)

2'0"			
	SOFT	1 2 2 2	S#15
	BLUE CLAY, VEINS OF FINE SAND SOFT	1 2 2 3	S#16
	SOFT	1 2 2 2	S#17
92'0"			

CONTINUED NEXT COLUMN

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels Figures in right hand column indicate number of blows required to drive TWO-INCH SPLIT SAMPLER 6 inches using 140 lb weight falling 30 inches ± Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb weight falling 24 inches ±

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION
37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEB. 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-3 (CONTINUED)

'0"

BLUE CLAY, VEINS OF FINE SAND

SOFT 1 2 2 3 S#19

'0"

DENSE MEDIUM SAND 24 S#20

'0"

BLUE CLAY, VEINS OF FINE SAND 17 9 12 S#20A

'6"

CONTINUED NEXT COLUMN

BORING #G-3 (CONTINUED)

136'6"

BLUE CLAY, VEINS OF FINE SAND

SOFT 1 2 2 2 S#21

157'0"

CONTINUED NEXT SHEET

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive 0-INCH SPLIT SAMPLER 6 inches using 140 lb weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEB. 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-3 (CONTINUED)

'0"

BLUE

CLAY,

VEINS

OF

FINE

SAND

SOPT 1 2 3 2 S#22

'0"

CONTINUED NEXT COLUMN

BORING #G-3 (CONTINUED)

177'0"

BLUE

CLAY,

VEINS

OF

FINE

SAND

194'0"

VERY DENSE 79 64 54 47 48 51 44

DROVE OPEN-END "A" FROM 194'6" TO 204'6" WITH 300 LB. WEIGHT

(NO RECOVERY) 40 43 46 47 49 49 54 61 74 80 81 80 [illegible]

204'6"

REFUSAL - NOT ENCOUNTERED

WATER LEVEL - TIDE
SIZE OF CASING 3", LENGTH 33'6"
NUMBER OF DRIVE SAMPLES(S), 24
DATE STARTED 12-8-78, COMPLETED 12-13-78
DRILLER: E. DESIMONE, INSPECTOR: G. MATHEW

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive 2-0-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION

37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date _____ Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-4

GROUND SURFACE ELEV. 16.52

16"	ASPHALT		
	SAND, GRAVEL, LITTLE LOAM, WOOD FILL	12 13 9 6	S#1
		5 5 6 6	S#2
5'0"	SAND, SOME GRAVEL, ORGANIC SILT, LITTLE WOOD FILL	2 2 2 1	S#3
		3 2 4 4	S#4
10'0"	ORGANIC SILT	1 2 2 1	S#5
16"	MEDIUM DENSE MEDIUM SAND, LITTLE FINE SAND, TRACE INORGANIC SILT	14 15 14 11	S#6
20'0"			

CONTINUED NEXT COLUMN

BORING #G-4 (CONTINUED)

30'0"	VERY DENSE FINE SAND, LITTLE INORGANIC SILT	12 25 33 20	S#7
33'0"	STIFF YELLOW CLAY, SOME FINE SAND	6 6	S#
36'0"	STIFF YELLOW CLAY	5 5	S#9
39'0"	MEDIUM BLUE CLAY,	2 2 3 2	S#
	MEDIUM	2 3 2 2	S#1
	VEINS OF FINE SAND SOFT	2 2 2 2	S#12
	MEDIUM	2 3 2	S#13
	MEDIUM	2 3 2	S#14
60'0"			

CONTINUED ON SHEET NO. 2

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive a TWO-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches ±

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION
37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF,INC., NEWTON UPPER FALLS,MA. Date FEB. 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM,BOSTON,MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-4 (CONTINUED)

10'0"

REFUSAL - NOT ENCOUNTERED

WATER LEVEL 10'0" TIDE, 2:00 PM, 12-8-79
SIZE OF CASING 2-1/2", LENGTH 35'0"
NUMBER OF DRIVE SAMPLES (S), 14
DATE STARTED & COMPLETED 12-8-78
DRILLER: S. DESIMONE, INSPECTOR: G. MATHEWS

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive 2-INCH SPLIT SAMPLER 0 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches ±.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-5

GROUND SURFACE ELEV. 16.76

	SAND, GRAVEL, CINDERS, WOOD FILL	8 5 6 5	S#1
		5 3 4 5	S#2
		2 5 6 2 3 3 2 1	NO REC. S#3
7'0"		4 4 4 6	NO REC.
	MEDIUM DENSE MEDIUM SAND	7 9 12 10	S#4
0'0"			
	VERY STIFF YELLOW CLAY, SOME FINE SAND	7 7 11 14	S#5
		17 14 10 17	S#6
9'0"			
	MEDIUM DENSE FINE SAND, SOME CLAY, LITTLE INORGANIC SILT	8 11 17 16	S#7
21'0"			

CONTINUED NEXT COLUMN

BORING #G-5 (CONTINUED)

32'0"			
	MEDIUM DENSE FINE SAND, SOME CLAY, LITTLE INORGANIC SILT		
34'0"			
	STIFF BLUE CLAY	8 7 6 6	S#8
39'0"			
	MEDIUM	2 2 3 3	S#9
	SOFT BLUE	2 2 2 3	S#10
	MEDIUM CLAY	2 3 2 2	S#11
	MEDIUM	2 3 3 3	S#12
	MEDIUM	2 3 2 2	S#13
62'0"			

CONTINUED NEXT SHEET

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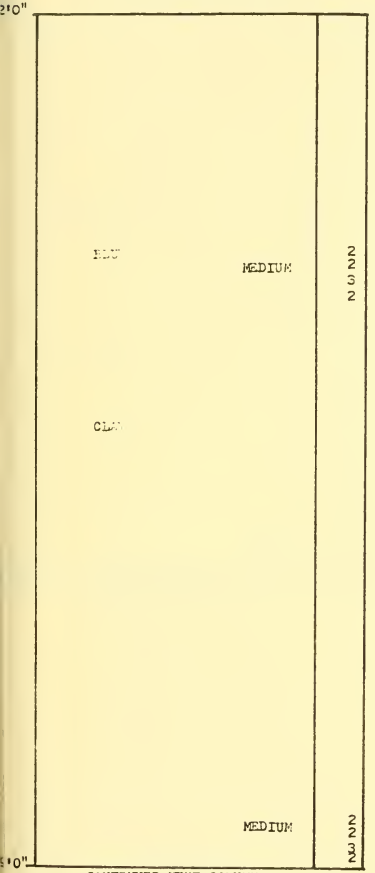
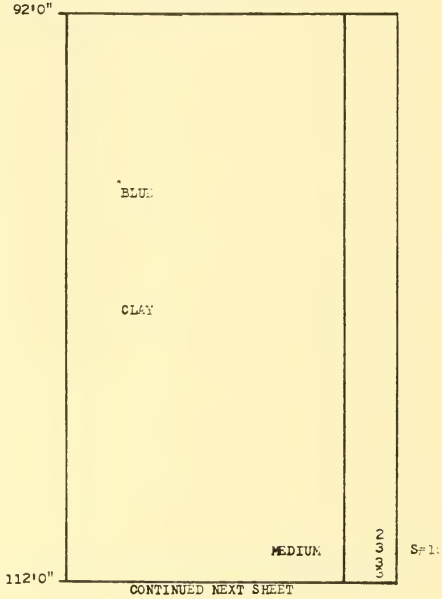
To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No 78Z75

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-5 (CONTINUED)



BORING #G-5 (CONTINUED)



l samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of rings, and do not necessarily represent permanent ground water levels Figures in right hand column indicate number of blows required to drive TWO-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of ows to drive casing one foot, using 300 lb. weight falling 24 inches ±

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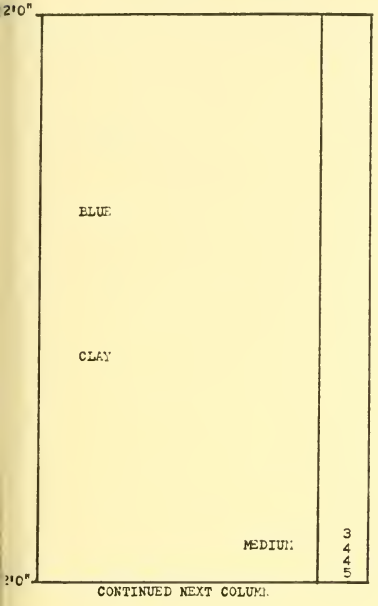
To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

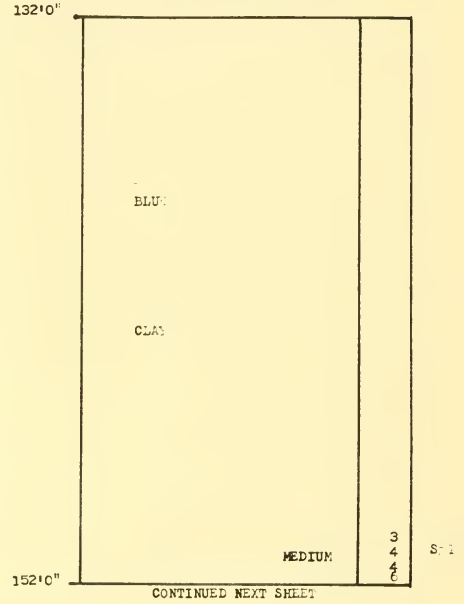
Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-5 (CONTINUED)



CONTINUED NEXT COLUMN

BORING #G-5 (CONTINUED)



CONTINUED NEXT SHEET

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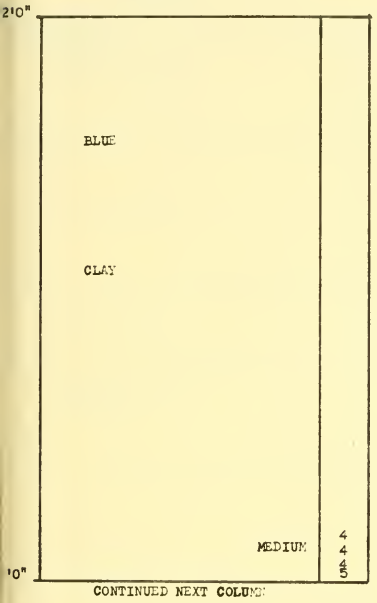
To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

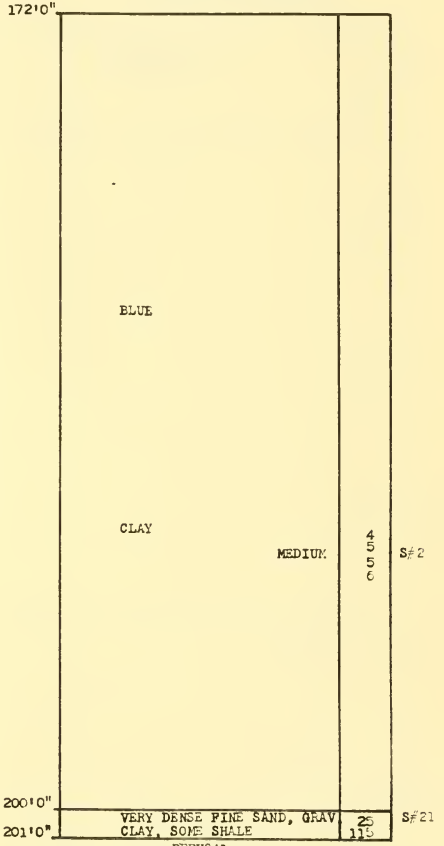
Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-5 (CONTINUED)



CONTINUED NEXT COLUMN

BORING #G-5 (CONTINUED)



- REFUSAL -
(120 BLOWS, NO PENETRATION, 300 LB. WGT.)

WATER LEVEL 9'0"
SIZE OF CASING 3", LENGTH 35'0"
NUMBER OF DRIVE SAMPLES(S), 21
DATE STARTED 12-14-78, DATE COMPLETED 12-19-78
DRILLER: STEPHEN DESIMONE
INSPECTOR: GREG MATTHEWS
OBSERVATION WELL INSTALLED 22'0" BELOW GROUND SURFAC, INCLUDING ROADWAY BOX.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-6

GROUND SURFACE ELEV. 18.27

0'6"	LOAM		
	SAND, GRAVEL, BOULDERS, TRACE WOOD FILL	17 14 20 20	S#1
4'0"	SAND, GRAVEL, LITTLE CINDERS, TRACE WOOD FILL	4 5 4 4	S#2
9'6"	ORGANIC SILT, TRACE OF FIBER	1 3 3 4	S#3
21'0"	ORGANIC SILT, SOME SHELLS, TRACE FINE SAND	1 5	S#4
51'6"	VERY DENSE MEDIUM SAND, SOME GRAVEL	18 20 18 30 37 44	S#4A S#5
		19 21 23 20	S#6
91'0"	CONTINUED NEXT COLUMN		

BORING #G-6 (CONTINUED)

29'0"	HARD YELLOW CLAY, VEINS OF FINE SAND	9 19 18 20	S#7
33'0"	VERY STIFF BLUE CLAY, VEINS OF FINE SAND	5 8 15 17	S#8
		8 14 16 17	S#9
		5 10 11 16	S#10
50'0"	MEDIUM BLUE CLAY	3 3 4 5	S#11
	MEDIUM STIFF	3 3 3 4	S#12
		4 4 4 4	S#13
60'0"			

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEB. 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO.2217) Scale 1" = 4 ft.

BORING #G-6 (CONTINUED)

'0"

WATER LEVEL 11'6"

SIZE OF CASING 2-1/2", LENGTH 30'0"
NUMBER OF DRIVE SAMPLES (S), 13
DATE STARTED 12-7-78, DATE COMPLETED 12-7-78
DRILLER: ANTHONY SASSO
INSPECTOR: GREG MATTHEWS
OBSERVATION WELL INSTALLED 29'0" BELOW
GROUND SURFACE

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-7

GROUND SURFACE ELEV. 16.02

	7 15 21 21	S-1	
S...	1 11 7 5	S-2	
G... ,			
W... ,	7 12 11 11	S-3	
F... ,			
...	6 2 7 7 4 2 3 1	N... I... , N... REF...	
ORGANIC	2		
SILT, S...	4 3	S-4	
SAN...	2		
F... ,			
SOM... FIB...	2 3 1 3	S-5 S-5A	
LOOSE PEATY SAND			
MEDIUM DENSE FINE SAND, LITTLE INORGANIC SILT	6 11 15 12	S-6	

BORING #G-7 (CONTINUED)

32'0"			
MEDIUM DENSE FINE SAND, LITTLE INORGANIC SILT			
34'6"			
STIFF BLUE CLAY, TRACE FINE SAND	6 6 8 7	S-7	
38'0"			
	2 2 3	S-...	
BLU...			
CLAY,	2 2 2	S	
VERY			
SOF...	2 3 2	S-1...	
SAND	3 2	S-11	
	2 2 2	S-12	
60'0"			

WATER LEVEL 12'0"
SIZE OF CASING 2-1/2", LENGTH 35'0"
NUMBER OF DRIVE SAMPLES (S),13
DATE STARTED 12-11-78, DATE COMPLETED 12-11-78
DRILLER: STEPHEN DESIMONE
INSPECTOR: GREG MATTHEWS
OBSERVATION WELL INSTALLED 33'0" BELOW GROUND SURFACE, INCLUDING ROADWAY BOX.

CONTINUED NEXT COLUMN

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive TWO-INCH SPLIT SAMPLER 0 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb weight falling 24 inches ±.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-8

GROUND SURFACE ELEV. 17.91

	SAND, GRAVEL, SOME LOAM, TRACE OF WOOD FILL	8 15 12 14	S#1
		11 9 5 6	S#2
0"	VERY SOFT ORGANIC SILT, TRACE OF FIBERS	1 1 1 1	S#3
5"	MEDIUM DENSE MEDIUM SAND, LITTLE GRAVEL	6 8 11	S#4
5"		24	S#4A
	DENSE MEDIUM SAND, SOME COARSE SAND, SOME GRAVEL	14 22 26 24	S#5
		10 14 12	S#6
6"		18	S#6A
	HARD YELLOW CLAY, LITTLE FINE SAND	7 13 12 13	S#7
0"			

CONTINUED NEXT COLUMN

BORING #G-8 (CONTINUED)

32'0"	HARD YELLOW CLAY, LITTLE FINE SAND		
34'0"	STIFF BLUE CLAY, VEINS OF FINE SAND	3 5 5 8	S#8
39'0"	VERY STIFF BLUE CLAY, SOME FINE SAND	7 8 15 19	S#9
44'0"	MEDIUM BLUE CLAY, VEINS OF FINE SAND	3 4 4 5	S#10
		2 3 3 4	S#11
		2 2 3 3	S#12
		3 3 4 5	S#13
60'0"			

WATER LEVEL 11'0"
SIZE OF CASING 2-1/2", LENGTH 30'0"
NUMBER OF DRIVE SAMPLES (S), 14
DATE STARTED 12-12-78, DATE COMPLETED 12-13-78
DRILLER: STEPHEN DESIMONE
INSPECTOR: GREG MATTHEWS
OBSERVATION WELL INSTALLED 10'0" BELOW GROUND SURFACE, INCLUDING ROADWAY BOX.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-9

GROUND SURFACE ELEV. 18.66

	SAND, GRAVEL, SOME BRICK, WOOD FILL	3 11 13 10	S#1
		4 3 2 2	S#2
16"	ORGANIC SILT, TRACE OF FIBRES	3 4 3 3	S#3
10"	DENSE COARSE SAND, GRAVEL	9 17 18 17	S#4
		20 16 14 17	S#5
		9 13 14 15	S#6
10"			

CONTINUED NEXT COLUMN

BORING #G-9 (CONTINUED)

31'10"	DENSE FINE SAND & CLAY, TRACE OF INORGANIC SILT	12 18 20 29	S# 7
35'10"	VERY STIFF YELLOW CLAY, SOME FINE SAND	10 9 9 9	S#
40'10"		4 3 6 6	NO REC.
	STIFF BLUE CLAY,	7 7 8 11	S#
		4 5 5 7	S# 10
		5 7 7 8	S# 11
	VEINS FINE SAND	4 5 5 7	S# 12
60'10"			

WATER LEVEL 22'0"
SIZE OF CASING 3", LENGTH 32'0"
NUMBER OF DRIVE SAMPLES (S), 13
DATE STARTED 12-18-78, DATE COMPLETED 12-19-7
DRILLER: ANTHONY SASSO, INSPECTOR: GREG MATTH
OBSERVATION WELL INSTALLED 30'0" BELOW GROUN
SURFACE, INCLUDING ROADWAY BOX

All samples have been visually classified by _____. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive _____ inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches ±.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-10

GROUND SURFACE ELEV. 19.01

		10	
		7	S#1
		8	
		6	
SAND,			
GRAVEL,			
SOME		10	
		12	S. 2
CINDERS,		17	
BRICK		19	
FILL			
		3	
		2	NO
		2	REC.
		1	
0"			
		9	
		12	S#3
SAND,		9	
GRAVEL,		6	
CLAY,			
BRICK,			
		5	
LITTLE		4	S#4
WOOD FILL		4	
		37	
10"			
MEDIUM			
DENSE FINE			
SAND, LITTLE		12	
CLAY, TRACE OF		15	S#5
INORGANIC SILT		15	
		17	
20"			

CONTINUED NEXT COLUMN

BORING #G-10 (CONTINUED)

29'0"			
		12	
		19	S#6
DENSE		25	
MEDIUM		31	
SAND,			
SOME FINE			
SAND		18	
		25	S#7
		23	
		23	
38'0"			
		7	
		6	S#8
		6	
		8	
STIFF			
BLUE			
		5	
CLAY,		6	S#9
		5	
		7	
VEINS			
OF		5	
		6	S#10
		7	
FINE		5	
SAND		5	
		6	S#11
		5	
		6	
57'0"			

CONTINUED NEXT SHEET

All samples have been visually classified by AJD. Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive TWO-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches ±.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-10 (CONTINUED)

10"

STIFF BLUE CLAY, VEINS OF FINE SAND

3 4 4 3 S#12

10"

MEDIUM BLUE CLAY, VEINS OF FINE SAND

2 2 3 3 S#13

MEDIUM BLUE CLAY, VEINS OF FINE SAND

2 2 3 2 S#14

10"

CONTINUED NEXT COLUMN

BORING #G-10 (CONTINUED)

90'0"

SOFT BLUE CLAY, VEINS OF FINE SAND

2 2 2 3 S. 1

SOFT

1 2 2 2 S#1

112'0"

CONTINUED NEXT SHEET

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-10 (CONTINUED)

2'0"

BLUE

CLAY,

VEIN

OF

FINE

SAND

SOFT

1
2
2
3

S#17

10"

CONTINUED NEXT COLUMN

BORING #G-10 (CONTINUED)

132'0"

BLUE

CLAY,

VEIN

OF

FINE

SAND

MEDIUM

2
2
3
3

S# 1

152'0"

CONTINUED NEXT SHEET

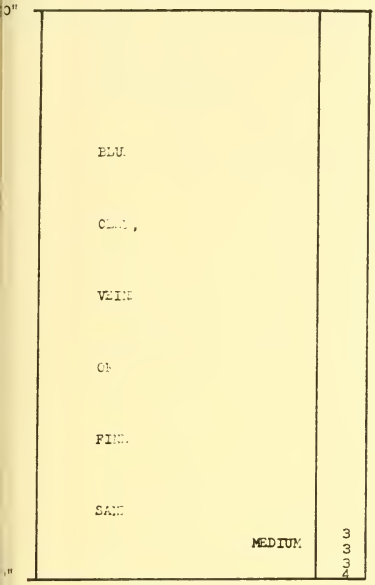
All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive TWO-INCH SPIT SAMPLER 6 inches using 140 lb weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION
37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

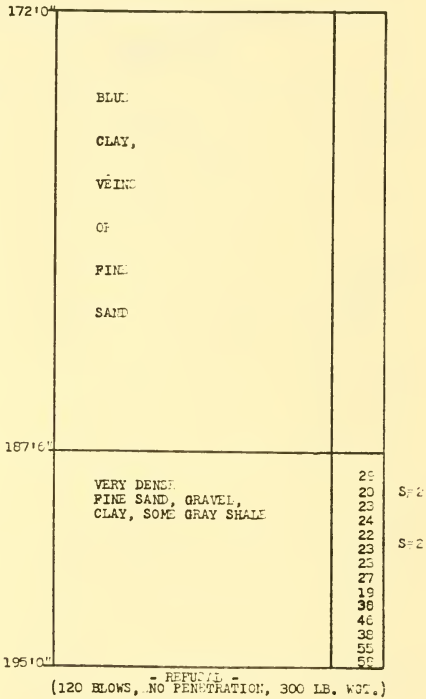
To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date _____ Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (CZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-10 (CONTINUED)



BORING #G-10 (CONTINUED)



(120 BLOWS, NO PENETRATION, 300 LB. WGT.)

WATER LEVEL 12'0"
SIZE OF CASING 3", LENGTH 40'0"
NUMBER OF DRIVE SAMPLES (S), 21
DATE STARTED 12-20-78, DATE COMPLETED 12-20-78
DRILLER: ANTHONY SASSO
INSPECTOR: GREG MATTHEWS

ll samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of orings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive 0 INCH SPLIT SAMPLER 6 inches using 140 lb weight falling 30 inches ±. Figures in column to left (if noted) indicate number of ows to drive casing one foot, using 300 lb. weight falling 24 inches ±.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 76275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-11

ROUND SURFACE ELEV. 18.20

SAND, GRAVEL, STONES, TRACE OF LOAM FILL	21 11 16 8	S#1	32'0"
SAND, GRAVEL, CLAY, SOME BRICK, STONES FILL	7 6 6 4	S#2	
	5 5 4 6	S#3	
	5 3 9 5	S#4	
DENSE FINE SAND, SOME CLAY, SOME INORGANIC SILT	19 21 22 22	S#5	
DENSE FINE SAND, SOME MEDIUM SAND, SOME INORGANIC SILT	19 20 22 19	S#6	
STIFF BLUE CLAY, TRACE OF FINE SAND	5 5 6 7	S#7	62'0"

CONTINUED NEXT COLUMN

BORING #G-11 (CONTINUED)

STIFF BLUE CLAY, TRACE OF FINE SAND			35'0"
MEDIUM DENSE FINE SAND, LITTLE MEDIUM SAND & CLAY	5 6 8 11	S#8	
	15 14 10 13	S#9	43'0"
STIFF BLUE CLAY, VEINS OF FINE SAND	5 6 8	S#10	
	4 4 4 5	S#11	
	9 12 11 8	S#12	
	4 5 5 6	S#13	

CONTINUED NEXT SHEET

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive 140-INCH SPLIT SAMPLER 6 inches using 140 lb weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb. weight falling 24 inches ±.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-11 (CONTINUED)

'0"

STIFF BLUE CLAY, VEINS OF FINE SAND

3 3 4 5 S#14

3 5 4 5 S#15

4 5 5 7 S#16

)"

BORING #G-11 (CONTINUED)

92'0"

STIFF BLUE CLAY, VEINS OF FINE SAND

4 4 4 4 S#1

112'0"

CONTINUED NEXT SHEET

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-11 (CONTINUED)

STIFF BLUE CLAY, VEINS OF FINE SAND	4 5 4 4	S#18
MEDIUM, SOME COARSE SAND, GRAVEL, STONES, TRACE OF CLAY	30 51 19 16 19 15 15 15 18 18 20 40	S#19, USED OER, 300 LB. WGT., FROM 135'6" TO 141'8"
DROVE OER, 300 LB. WEIGHT	120	2"

- REFUSAL -
(120 BLOWS, NO PENETRATION, 300 LB. WGT.)

WATER LEVEL 14'6"
SIZE OF CASING 3", LENGTH 45'0"
NUMBER OF DRIVE SAMPLES (S), 19
DATE STARTED:1-8-79, DATE COMPLETED 1-11-79
DRILLER: JOSEPH CENTRELLA
INSPECTOR: ROBERT PALERMO
OBSERVATION WELL INSTALLED 29'0" BELOW GROUND SURFACE.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-12

GROUND SURFACE ELEV. 17.68

SAND, GRAVEL, TRACE OF LOAM, STONES FILL	2 4 6 14	S#1
	12 12 6 5	S#2
FINE SAND, SOME FINE GRAVEL	1 1 1 1	S#3
MEDIUM DENSE MEDIUM SAND	5 10 12 8	S#4
DENSE MEDIUM, SOME COARSE SAND, SOME GRAVEL	17 15 15 14	S#5
	10 12 17 18	S#6
MEDIUM DENSE MEDIUM, SOME COARSE SAND, SOME GRAVEL	10 10 10 10	S#7

CONTINUED NEXT COLUMN

BORING #G-12 (CONTINUED)

32'10" MEDIUM DENSE MEDIUM, SOME COARSE SAND, SOME GRAVEL		
34'10" STIFF YELLOW CLAY, SOME FINE SAND	11 7 10 14	S#8
38'10" STIFF BLUE CLAY, SOME FINE SAND	5 5 7 7	S#9
	9 6 5 6	S#10
48'10" MEDIUM BLUE CLAY, VEINS OF FINE SAND	3 4 4 5	S#11
	3 3 4 4	S#12
	3 4 3 3	S#13
60'0"		

WATER LEVEL 14'0"
SIZE OF CASING 2-1/2", LENGTH 35'0"
NUMBER OF DRIVE SAMPLES (S), 13
DATE STARTED 12-13-78, DATE COMPLETED 12-14-78
DRILLER: STEPHEN DESIMONE, INSP., GREG MATTH
OBSERVATION WELL INSTALLED 10'0" BELOW GROUN
SURFACE, INCLUDING ROADWAY BOX.

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of drilling, and do not necessarily represent permanent ground water levels Figures in right hand column indicate number of blows required to drive 2-INCH SPLIT SAMPLER 0 inches using 140 lb weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb weight falling 24 inches ±.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-13

GROUND SURFACE ELEV. 17.35

	14	S#1	
	44		
SAND,	20		
	17		
GRAVEL, STONES,			
SOME WOOD,			
LITTLE COAL			
	25		
FILL	10	S#2	
	8		
	7		
	3		
	4	NO	
	2	REC.	
	2		
SAND,	3		
	2	S#3	
GRAVEL,	2		
	2		
GLASS,			
CINDERS,	2	NO	
	2	REC.	
ASHES,	2		
	2		
TRACE OF	6		
	7	NO	
ORGANIC SILT	5	REC.	
	3		
FILL	4		
	2	S#4	
	2		
	3		
	3		
	2	NO	
	2	REC.	
	17		
MEDIUM DENSE	15	S#5	
	15		
FINE SAND, SOME	16		
INORGANIC SILT,			
SOME CLAY			

CONTINUED NEXT COLUMN

BORING #G-13 (CONTINUED)

30'0"

	14	S#6	
	9		
	9		
VERY STIFF	18		
BLUE CLAY,			
SOME FINE SAND			
	20	S	
	10		
	9		
	9		

39'6"

		5	S#	
	MEDIUM	4		
		4		
		6		
BLUE	MEDIUM	5	S	
		4		
		4		
CLAY,		5		
VEINS	MEDIUM	4	S#	
		4		
		3		
OF		4		
FINE	MEDIUM	3	S#	
		4		
		3		
SAND		4		
	MEDIUM	3	S#1	
		4		
		3		
		3		

62'0"

CONTINUED NEXT SHEET

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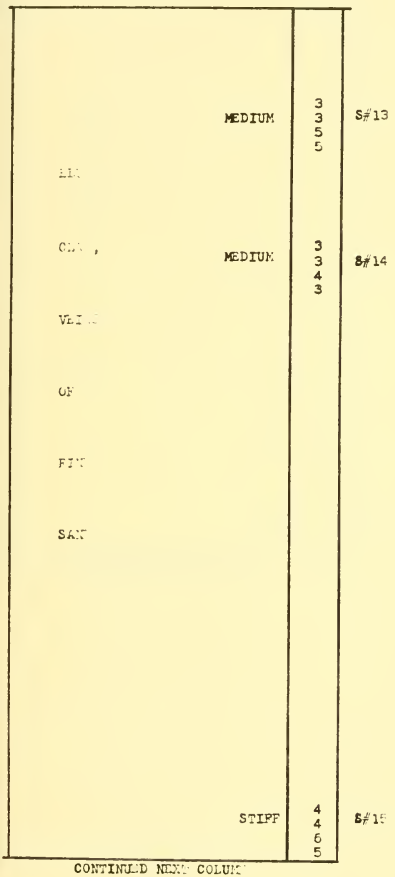
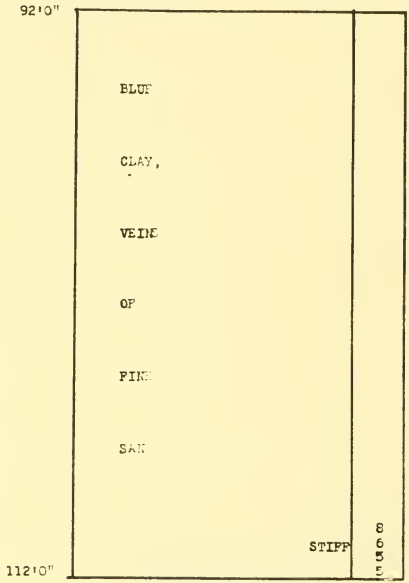
Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING G-13 (CONTINUED)



BORING #G-13 (CONTINUED)



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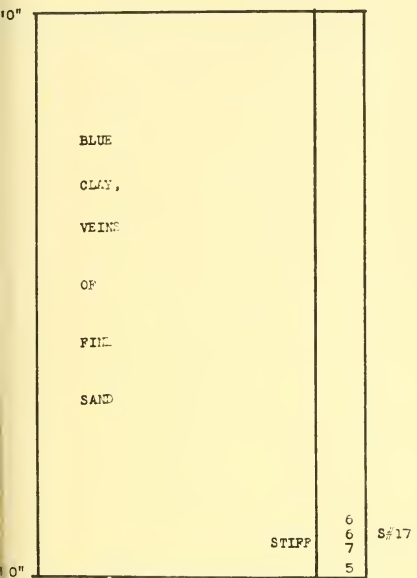
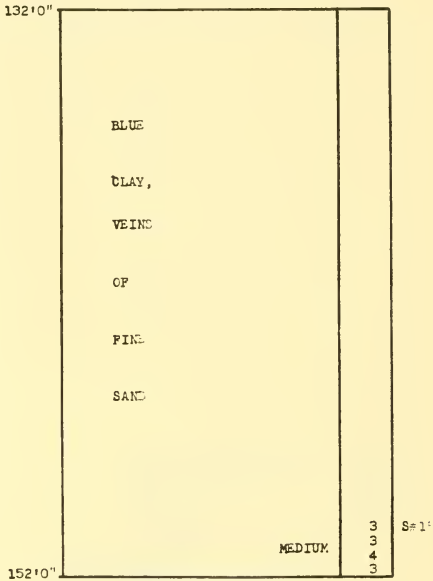
Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-13 (CONTINUED)



CONTINUED NEXT COLUMN

BORING #G-13 (CONTINUED)



CONTINUED NEXT SHEET

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date _____ Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-13 (CONTINUED)

2'10"

BLUE

CLAY,

VEIN

OF

FINE

SAND

MEDIUM 4 4 3 5 S#19

5'10"

CONTINUED NEXT COLUMN

BORING #G-13 (CONTINUED)

172'10"

BLUE

CLAY,

VEIN

OF

FINE

SAND

187'6"

VERY DENSE FINE SAND, GRAVEL, STONES, SOME SHALE 78 60 60 112 S#2 -2' -4'

190'0"

- REFUSAL -

WATER LEVEL 10'6"
SIZE OF CASING 3", LENGTH 30'0"
NUMBER OF DRIVE SAMPLES (S) 20
DATE STARTED 1-1-79, DATE COMPLETED 1-3-79
DRILLER: JOSEPH CENTRELLA
INSPECTOR: GREG MATTHEWS
OBSERVATION WELL INSTALLED 16'0" BELOW GROUND SURFACE.

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o GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

ocation COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-14

ROUND SURFACE ELEV. 30.56

	10 13 16 19	S#1
	6 5 6 6	S#2
SAND,		
GRAVEL,		
	6 7 12 9	S#3
BRICK,		
WOOD,		
	18 12 7 8	S#4
CINDERS,		
FILL		
	34 11 8 9	S#5
"		

- OBSTRUCTION -

WATER LEVEL 6'0"
SIZE OF CASING 3", LENGTH 20'0"
NUMBER OF DRIVE SAMPLES (S), 5
DATE STARTED 1-3-79, DATE COMPLETED 1-3-79
DRILLER: JOSEPH CENTRELLA
INSPECTOR: GREG MATTHEWS

samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of rings and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive NCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of ows to drive casing one foot, using 300 lb weight falling 24 inches ±.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-14A

GROUND SURFACE ELEV. 30.58 ±

SAND, GRAVEL, BRICK, STONES, WOOD FILL		
FILL	7 8 7 6	S#1
	6 4 6 7	S#2
	8 29 40 29	S#3

0'

CONTINUED NEXT COLUMN

BORING #G-14A (CONTINUED)

32'0"

SAND, GRAVEL, BRICK, STONES, WOOD FILL	39 15 21 11	NO REC.

39'0"

DENSE FINE SAND, SOME CLAY, TRACE OF INORGANIC SILT	15 21 14 10	S#4
	13 12 18 13	S#5

49'0"

DENSE MEDIUM SAND, SOME FINE SAND, TRACE INORGANIC SILT	29 21 23 21	S#6
	25 23 24 25	S#7

60'0"

CONTINUED NEXT SHEET

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Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-14A (CONTINUED)

0"		
	5 6 7 9	S#8
STIFF		
BLUE	7 6 5 6	S#9
CLAY,		
SOME		
FINE	6 5 6 6	S#10
SAND		
0"	2[illegible] 28 29 3[illegible]	S#11
VERY DENSE		
	41 36 39 43	S#12
MEDIUM		
SAND		
	36 31 28 27	S#13
	25 31 39 41	S#14
0"		

CONTINUED NEXT COLUMN

BORING #G-14A (CONTINUED)

92'0"		
VERY DENSE		
MEDIUM		
SAND	21 29 39 40	S#15
98'0"		
	1 2 2 5	S#16
MEDIUM		
TO STIFF		
BLUE		
CLAY		
	7 7 7 7	S#17
122'0"		

CONTINUED NEXT SHEET

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Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-14A (CONTINUED)

MEDIUM		
TO STIFF		
BLUE		
CLAY	6	S#18
	7	
	6	
	6	

CONTINUED NEXT COLUMN

BORING #G-14A (CONTINUED)

153'0"

	21	S#19
	39	OEL.,
VERY DENSE	42	300 L
	39	WEIGH
	56	
FINE SAND,	19	
	26	
	49	
GRAVEL, STONES,	48	
	69	
LITTLE INORGANIC	45	
	43	
	47	
SILT	55	
	41	
	38	
	31	
	39	
	39	
	21	

163'0"

REFUSAL-NOT ENCOUNTERED

WATER LEVEL 14'6"
SIZE OF CASING 3", LENGTH 100'0"
NUMBER OF DRIVE SAMPLES (S), 19
DATE STARTED 1-17-79, DATE COMPLETED 1-22-79
DRILLER: JOSEPH CENTRELLA
INSPECTOR: GREG MATTHEWS
OBSERVATION WELL INSTALLED 29'0" BELOW GROUND SURFACE.

NOTE: THIS BORING MADE 3'0" WEST OF ORIGINAL BORING LOCATION.

samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of ngs, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive O-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of vs to drive casing one foot, using 300 lb. weight falling 24 inches ±.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-15

GROUND SURFACE ELEV. 17.34

SAND, SOME CINDERS, GRAVEL, BOULDERS, LITTLE BRICK FILL	12 19 23 40	S#1	
SANT, LITTLE CINDERS, TRACE GRAVEL FILL	4 5 7 8	S#2	3'10"
	10 13 11 10	S#3	
VERY DENSE MEDIUM SAND & GRAVEL	43 37 28 26	S#4	
	10 14 19 24	S#5	
DENSE FINE SAND, SOME INORGANIC SILT, TRACE OF CLAY	18 19 22 21	S#6	
	20 17 16 21	S#7	

CONTINUED NEXT COLUMN

BORING #G-15 (CONTINUED)

			32'0"
HARD YELLOW CLAY, SOME FINE SAND	19 26 21 16	S#8	
STIFF	5 6 9 10	S#9	
	5 5 7 9	S#10	
BLUE CLAY, VEINS OF FINE SAND	6 5 8 10	S#11	
	5 5 6 7	S#12	
	6 6 7 7	S#13	60'0"

WATER LEVEL 9'0"
SIZE OF CASING 3", LENGTH 35'0"
NUMBER OF DRIVE SAMPLES (S),13
DATE STARTED 12-19-78, DATE COMPLETED 12-20-78
DRILLER: ANTHONY SASSO
INSPECTOR: GREG MATTHEWS

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CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION

37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-16

GROUND SURFACE ELEV. 34.09

	SAND GRAVEL, LITTLE LOAM, BRICK FILL	9 11 6 3	S#1
10'			
	LOAM SAND SAND GRAVEL FILL	4 3 4 4	S#2
		4 3 3 2	S#3
10"			
10'	SAND, GRAV. LOAM FILL	19 12	S#4 S#4A
	MEDIUM DENSE MEDIUM, LITTLE FINE SAND, SOME GRAVEL	12 8 8 8	S#5
10"			
	MEDIUM DENSE COARSE SAND & GRAVEL	10 9 7 4	S#6
10"			

CONTINUED NEXT COLUMN

BORING #G-16 (CONTINUED)

30'0"			
	MEDIUM DENSE ORGANIC SILTY MEDIUM SAND, TRACE OF SHELLS	9 6 7 8	S#7
33'0"			
	DENSE MEDIUM SAND	12 16 19 18	S#
		13 18 16 16	S#9
44'0"			
	VERY STIFF YELLOW CLAY, SOME FINE SAND	12 13 13 14	S#1
49'0"			
	MEDIUM DENSE FINE SAND	14 11 15 19	S#11
55'0"			
	VERY STIFF YELLOW CLAY, SOME FINE SAND	12 11 15 19	S#12
59'0"			

CONTINUED NEXT SHEET

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 76275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILD NO. 2217) Scale 1" = 4 ft.

BORING #G-16 (CONTINUED)

0"		
STIFF	5	S#13
	6	
BLUE	7	
	7	
CLAY		
	5	
	5	S#14
	5	
0"	6	

WATER LEVEL 31'0"
SIZE OF CASING 3", LENGTH 46'0"
NUMBER OF DRIVE SAMPLES (S), 15
DATE STARTED 12-19-79, DATE COMPLETED 12-20-79
DRILLER: STEPHEN DESIMONE
INSPECTOR: GREG MATTHEW

samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of rings, and do not necessarily represent permanent ground water levels Figures in right hand column indicate number of blows required to drive -INCH SPLIT SAMPLER 6 inches using 140 lb weight falling 30 inches ± Figures in column to left (if noted) indicate number of ows to drive casing one foot, using 300 lb. weight falling 24 inches ±

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-17

GROUND SURFACE ELEV. 36.72

		26
		30
		33
		40
SAND,		
GRAVEL,		
		17
SOME BRICK,		17
		19
		14
GLASS,		
ASHES,		
TRACE OF LOAM		14
		9
		9
FILL		8
		16
		7
		5
		7
0"		
SAND,		12
		11
		9
		9
GRAVEL,		
FILL		8
		7
		8
		8
0"		
COARSE SAND & GRAVEL FILL		9
		3
		2
0"		1

CONTINUED NEXT COLUMN

BORING #G-17 (CONTINUED)

32'0"		
ORGANIC SILTY SAND, GRAVEL, LITTLE SHELLS		1
		1
		8
		15
35'0"		
MEDIUM DENSE, MEDIUM SAND, SOME ORGANIC SILT, LITTLE SHELLS		16
		7
		8
		6
38'0"		
MEDIUM		
DENSE, MEDIUM		15
SAND		12
		15
		15
44'0"		
DENSE		16
MEDIUM		19
SAND		22
		30
49'0"		
VERY DENSE		20
		37
		22
		19
FINE SAND, LITTLE		
MEDIUM SAND, TRACE		
		29
		30
OF INORGANIC SILT		31
		24
60'0"		
VERY DENSE		34
		76
MEDIUM		
SAND		
64'0"		

CONTINUED NEXT SHEET

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Location COLUMBIA POINT REDEVEOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-17 (CONTINUED)

'0"

VERY DENSE
FINE SAND, LITTLE
INORGANIC SILT

24
39
21
28

'6"

4
4
4
5

MEDIUM

BLUE CLAY,

VEINS OF

FINE

SAND

'0"

CONTINUED NEXT COLUMN

BORING #G-17 (CONTINUED)

90'0"

3
4
4
5

MEDIUM

BLUE CLAY,

VEINS OF

FINE

SAND

5
4
4
4

122'0"

CONTINUED NEXT SHEET

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Location COLUMBIA POINT REDEVELOPMENT, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-17 (CONTINUED)

'10"

MEDIUM

BLUE CLAY,

VEIN

FINE

SAND

3
3
4
4

'10"

CONTINUED NEXT COLUMN

BORING #G-17 (CONTINUED)

142'10"

MEDIUM

BLUE CLAY,

VEINS OF

FINE

SAND

3
3
4
5

162'10"

CONTINUED NEXT SHEET

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Location COLUMBIA POINT REDEVELOPMENT, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-17 (CONTINUED)

MEDIUM	
BLUE CLAY,	
VERY [illegible]	
FINE	
SAND	
VERY DENSE	24
	21
	28
	58
	52
FINE SAND, GRAVEL,	60
	40
STONES & CLAY	29
	76
	112
	97
	131

- REFUSAL -

WATER LEVEL 30'0"
SIZE OF CASING 3", LENGTH 70'0"
NUMBER OF DRIVE SAMPLES (S), 22
DATE STARTED 12-21-78, DATE COMPLETED 1-2-79
DRILLER: STEPHEN DESIMONE
INSPECTOR: GREG MATTHEWS

samples have been visually classified by AJD. Unless otherwise specified, water levels noted were observed at completion of ings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive O-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of ws to drive casing one foot, using 300 lb. weight falling 24 inches ±.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 5, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-18
GROUND SURFACE ELEV. 25.1

6"	SAND, GRAVEL, SOME LOAM FILL	1 2 3	S#1
	SAND, GRAVEL, BRICK, WOOD, CINDERS FILL	30 36 17 29 71 67 50 56	S#2 S#3
		39 41 24 19	S#4
0"	CINDERS, ASHES FILL	9 3 3 3	S#5
0"	MEDIUM DENSE COARSE SAND, LITTLE GRAVEL	11 10 11 14	S#6
		10 11 11 12	S#7

CONTINUED NEXT COLUMN

BORING #G-18 (CONTINUED)

32'0"			
33'6"	MEDIUM DENSE COARSE SAND, LITTLE GRAVEL		
	MEDIUM DENSE FINE SAND, SOME INORGANIC SILT, TRACE OF CLAY	11 12 14 14	S#8
40'0"			
	STIFF BLUE CLAY, VEINS OF FINE SAND	7 7 9 13	S#9
45'0"			
	MEDIUM DENSE FINE SAND, SOME INORGANIC SILT, TRACE OF CLAY	15 13 13 10	S#10
51'0"			
	STIFF BLUE CLAY, VEINS OF FINE SAND	7 7 9 10	S#11
		7 7 8 9	S#12
		6 6 7 7	S#13
60'0"			

WATER LEVEL 12'0"
SIZE OF CASING 3", LENGTH 40'0"
NUMBER OF DRIVE SAMPLES (S), 13
DATE STARTED 12-27-78, DATE COMPLETED 12-27-78
DRILLER: JOHN DESIMONE
INSPECTOR: GREG MATTHEWS.

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Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-19

16"	ASPHALT		
	SAND, GRAVEL, STONES FILL	40 37 35 42	S#1
16"	SAND, SOME GRAVEL, TRACE OF LOAM FILL	10 9 8 8	S#2
10"	SAND, LITTLE GRAVEL, TRACE ORGANIC SILT FILL	3 3 2 3	S#3
		2 2 3 2	S#4
0"	MEDIUM DENSE, MEDIUM SAND, LITTLE FINE SAND, SOME GRAVEL, TRACE OF INORGANIC SILT	7 8 7 6	S#5
		8 7 6 9	S#6
0"	DENSE, MED. SAND, LITTLE COARSE SAND & GRAVEL, TRACE OF INORGANIC SILT	24 25	S#7
0"			

CONTINUED NEXT COLUMN

BORING #G-19 (CONTINUED)

26'0"			
		15 15	S#7A
	DENSE FINE SAND, SOME CLAY, LITTLE INORGANIC SILT	17 15 16 16	S#8
		8 12 18 17	S#9
39'0"			
		3 3 3 4	S#10
	MEDIUM BLUE CLAY, VEINS OF FINE SAND	3 4 3 3	S#11
58'0"			

CONTINUED NEXT SHEET

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o GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date _____ Job No. 78275

ocation COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-19 (CONTINUED)

0"

MEDIUM 3 3 4 4 S#12

BLUE

CLAY,

VEINS OF

FINE

SAND

3 3 3 3 3 S#13

0"

CONTINUED NEXT COLUMN

BORING #G-19 (CONTINUED)

90'0"

MEDIUM

BLUE

CLAY,

VEINS OF

FINE

SAND

(illegible) S#14

122'0"

CONTINUED NEXT SHEET

A samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of
x ngs, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive
D-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of
ows to drive casing one foot, using 300 lb. weight falling 24 inches ±.

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date _____ Job No. 76275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-19 (CONTINUED)

'0"

MEDIU

BLU

CLA ,

VEINS OF

FIN

SAN

3
4
3
4 S#15

4
3
3
4 S#16

0"

CONTINUED NEXT COLUM

BORING #G-19 (CONTINUED)

154'0"

MEDIUM

BLUE

CLAY,

VEINS OF

FINE

SAND

4
4
3
3 S#17

185'0"

CONTINUED NEXT SHEET

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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date _____ Job No. 76Z75

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-19 (CONTINUED)

'0"

3
4
3
4

S#15

MEDIUM

BLUE

CLAY,

VEINS OF

FINE

SAND

4
3
3
4

S#16

0"

CONTINUED NEXT COLUMN

BORING #G-19 (CONTINUED)

154'0"

MEDIUM

BLUE

4
4
3
3

S#1

CLAY,

VEINS OF

FINE

SAND

165'0"

CONTINUED NEXT SHEET

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Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-19 (CONTINUED)

ED"		4 4 5 4	S#18
	MEDIUM BLUE CLAY, VEINS OF FINE SAND		
5"	VERY DENSE MEDIUM SAND, LITTLE FINE SAND, GRAVEL, STONES, SOME CLAY	47 17 40 23 2F	3" 3" S#19, FROM 208'6" TO 208'9" 140LB. WGT., OER. FROM 208'9" TO 210'6" 300 LB. WGT. OER.
5"			

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To GOLDBERG-SOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 9, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-20

ROUND SURFACE		
" ASPHALT		
LOAMY ORGANIC SILT, TRACE FINE SAND	13 11 10 10	S#1
" VERY SOFT, ORGANIC SILT, LITTLE FINE SAND	1 1 1 1	S#2
VERY SOFT PEAT, SOME FIBRUS	1 1 1 2	S#3
MEDIUM DENS., FINE SAND, SOME MEDIUM SAND, GRAVEL, LITTLE CLAY, TRACE INORGANIC SILT	14 14 14 17	S#4
MEDIUM DENSE, MEDIUM SAND, SOME COARSE SAND, GRAVEL	11 13 14 12	S#5
HARD YELLOW CLAY, SOME FINE SAND	17 15 22 18	S#6
	15 16 18 17	S#7

CONTINUED NEXT SHEET

BORING #G-20 (CONTINUED)

32'6"		
34'0"		
VERY STIFF, BLUE CLAY, VEINS OF FINE SAND	12 8 10 12	S#8
	10 9 6 6	S#9
45'0"		
MEDIUM BLUE CLAY, VEINS OF FINE SAND	4 4 3 4	S#10
62'6"		

CONTINUED NEXT SHEET

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Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING G-20 (CONTINUED)

6"	DENSE, FINE SAND, SOME CLAY	16 16 21 35	S#11
0"	MEDIUM BLU CLAY	3 3 4 3	S#12
		3 4 4	S#13
"	CONTINUED NEXT SHEET		

BORING #G-20 (CONTINUED)

90'0"	MEDIUM BLU CLAY	2 3 3	S#1-
110'0"	- CONTINUED NEXT SHEET		

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BORING #G-20 (CONTINUED)

"		
	MEDIUM	
	BLU	
	CLAY	
	VERY DENS	10
	MEDIUM	31
		20
		15
	SAND	S#15

CONTINUED NEXT SHEET

BORING #G-20 (CONTINUED)

132'0"		4
		5
	MEDIUM	3
		4 S#16
	BLUE CLAY,	
	.	
	TRACE OF FIN	
	SAND	
153'0"		10
	BLUE	11
	CLAY, VERY	10
	OF FINE	12 S#17
	SAND	
160'0"		22
	VERY DENSE,	37
	FINE SAND, SOME INOR.	50
	SILT, TRACE OF CLAY	60 S#18
164'0"		

CONTINUED NEXT SHEET

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Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-20 (CONTINUED)

0"

5 S#19
6
6
5

STIFF

BLUE

CLAY,

VEINS OF

FINE SAND

5 S#20
6
6
7

0'

CONTINUED NEXT SHEET

BORING #G-20 (CONTINUED)

187'0"

STIFF

BLUE

CLAY,

VEINS OF

FINE SAND

7
6
7
6

212'0"

CONTINUED NEXT SHEET

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Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-20 (CONTINUED)

2'0"

STIL...

...

C... ,

VERY ...

FI... ...

2'0"

VERY DENSE, FINE SAND, GRAVEL, STONES, LITTLE CLAY, TRACE OF SHALE

82
27
22
19
15
8
17
23
13
38
123

..." S.22, FROM 228'0" TO 23...
140LB. WGT., GZ...

3'6" - REFUSAL -
(120 BLOWS, NO PENETRATION, 300 LB. WGT)

WATER LEVEL 6'0"
SIZE OF CASING 3", LENGTH 45'0"
NUMBER OF DRIVE SAMPLES (S), 22
DATE STARTED 1-19-79, DATE COMPLETED 1-29-79
DRILLER: JOSEPH CENTRILLA
INSPECTOR: RICHARD LAI

NOTE: USED OPEN-END "A" ROD WITH 300 LB. WGT., FROM 228'6" TO 233'6".

samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of rings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of lows to drive casing one foot, using 300 lb weight falling 24 inches ±

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION

37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 9, 1979 Job No. 76Z75

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-21

GROUND SURFACE

0'6"	ASPHALT		
		10	S#1
		11	
		13	
		14	
	SAND,		
		12	S#2
	GRAVEL, STONES,	7	
		7	
		9	
	LITTLE CINDERS, TRACE		
	OF ASHES FILL		
		6	S#3
		5	
		4	
		5	
3'0"			
	PEAT		
		3	S#4
5'0"		5	S#5
		9	
		12	
	MEDIUM		
	DENSE, MEDIUM &		
	COARSE SAND, LITTLE		
	GRAVEL	12	S#6
		14	
		13	
		16	
25'0"			
	DENSE	17	S#7
		19	
	FINE SAND, SOME	16	
		17	
	MEDIUM SAND, SOME		
	GRAVEL		
		20	S#7
		14	
		17	
30'0"		20	

CONTINUED NEXT COLUMN

BORING #G-21 (CONTINUED)

32'10"	DENSE FINE SAND, SOME MEDIUM SAND, SOME GRAVEL		
34'6"			
		4	S#8
	STIFF	4	
		5	
	BLUE CLAY,	4	
	TRACE OF FINE		
	SAND	4	S#9
		4	
		5	
43'10"		4	
		2	S#10
		2	
		2	
		2	
	MEDIUM		
	BLUE		
	CLAY		
		3	S#11
		2	
		3	
		2	
		3	S#12
		3	
		2	
		2	
		3	S#13
		3	
		3	
62'10"		4	

CONTINUED NEXT SHEET

All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive 2-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION

37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 9, 1979 Job No 76275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILL NO. 2217) Scale 1" = 4 ft.

BORING #G-21 (CONTINUED)

'10"

4 3 3 4 S#14

4 4 3 2 S#15

L L

BLU

CL Y

3 4 3 3 S#16

10"

CONTINUED NEXT COLUMN

BORING #G-21 (CONTINUED)

92'10"

MEDIUM

BLUE

CLAY

4 3 4 4 S#17

112'10"

CONTINUED NEXT SHEET

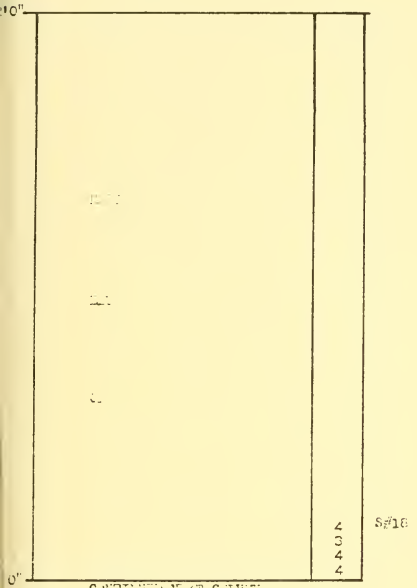
samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive TWO-INCH SPLIT SPOON 6 inches using 140 lb weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION
37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

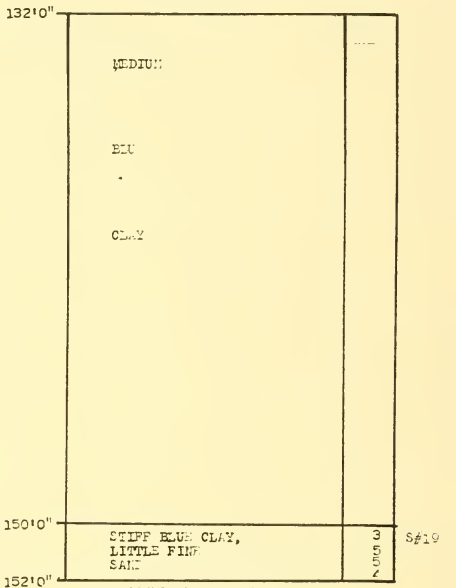
To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 9, 1979 Job No 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-21 (CONTINUED)



BORING #G-21 (CONTINUED)



All samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of borings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive 2"-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of blows to drive casing one foot, using 300 lb weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION
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To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 9, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-21 (CONTINUED)

'0"		
	5 5 6 6	S#20
0"	87 28 40 47 46 36 40 26 23 40 80	6" S#21 FROM 177'0" TO 177'6" (140 LB. WGT., OER.)
		WATER LEVEL 9'6" SIZE OF CASING 3", LENGTH 45'0" NUMBER OF DRIVE SAMPLES (S), 22 DATE STARTED 1-22-79, DATE COMPLETED 1-30-79 DRILLER: JOSEPH CENTRELLA INSPECTOR: RICHARD LAI OBSERVATION WELL INSTALLED 16'6" BELOW GROUND SURFACE NOTE: USED OER, 300LB. WEIGHT FROM 177'6" TO 162'6"
5"	- REFUSAL - (120 BLOWS, NO PENETRATION, OER, 300LB. WGT.)	

l samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of brings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive 0-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of bws to drive casing one foot, using 300 lb. weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION

37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 9, 1979 Job No. 78275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-22

ROUND SURFACE

6"	ASPHALT	0	S#1
	SAND, GRAVEL, STONES, BRICK FILL	17 10 21	
0"	SAND, GRAVEL, STONES, CINDERS FILL	6 9 9 10	S#2
0"	SOFT PEAT	2 1 2 1	S#3
)"	PEAT, SOME SAN	1 2	S#4
)"	MEDIUM SAND, SOME INORGANIC SILT, TRACE FINE GRAVEL	8	S#4A
)"	VERY STIFF YELLOW CLAY	10 11 12 12	S#5
)"	MEDIUM BLUE CLAY	3 3 4 5	S#6
)"			

CONTINUED NEXT COLUMN

BORING #G-22

30'0"			S#7
	MEDIUM	3 3 4 3	S#
	BLUE	3 3 3 3	S#
	CLAY	3 4 4 5	S#1
		4 4 4 4	S#11
57'0"		3 3 3 4	S#12

CONTINUED NEXT SHEET

samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of ings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive -INCH SPLIT SAMPLER 0 inches using 140 lb weight falling 30 inches ±. Figures in column to left (if noted) indicate number of ws to drive casing one foot, using 300 lb weight falling 24 inches ±.

CARR-DEE TEST BORING AND CONSTRUCTION CORPORATION

37 LINDEN STREET P.O. BOX 321 MEDFORD, MASSACHUSETTS 02155 Telephone 391-4500

To GOLDBERG-ZOINO-DUNNICLIFF, INC., NEWTON UPPER FALLS, MA. Date FEBRUARY 9, 1979 Job No. 76275

Location COLUMBIA POINT REDEVELOPMENT PROGRAM, BOSTON, MA. (GZD FILE NO. 2217) Scale 1" = 4 ft.

BORING #G-22

'10"			
	MEDIUM BLUE CLAY	4 3 4 4	S#13
'0"	DENSE MEDIUM, SOME COARSE SAND, GRAVEL, STONES, SOME CLAY	24 23 19 17	S#14
'6"		*7 7 6 6	S#15
	MEDIUM		
	DENSE,	11 7 10 17	S#16
	MEDIUM, SOME		
	COARSE SAND,	10 9 9 10	S#17
	GRAVEL		
		11 12 11 13	S#1.
0"	CONTINUED NEXT COLUMN		

BORING #G-22

85'0"			
	DENSE, COARSE TO VERY COARSE SAND, GRAVEL	17 16 18 19	S#19
		22 25 24 26	S#2.
95'0"			
	MEDIUM DENSE FINE SAND & CLAY	10 12 13 16	S#21
		14 14 18	S#2.
101'6"	VERY DENSE FINE SAND, GRAVEL, STONES, SOME SHALE	*125	S#2. 5"
103'0"			

- REFUSAL -
(100 BLOWS, NO PENETRATION, OER., 300 LB. WGT.)

WATER LEVEL 13'6"
SIZE OF CASING 3", LENGTH 100'0"
NUMBER OF DRIVE SAMPLER (S), 24
DATE STARTED 1-30-79, DATE COMPLETED 2-6-79
DRILLER: JAMES YOUNG
INSPECTOR: RICHARD LAI
*USED OPEN-END "A" ROD, 140 LB. WGT.)

samples have been visually classified by AJD Unless otherwise specified, water levels noted were observed at completion of ings, and do not necessarily represent permanent ground water levels. Figures in right hand column indicate number of blows required to drive 0-INCH SPLIT SAMPLER 6 inches using 140 lb. weight falling 30 inches ±. Figures in column to left (if noted) indicate number of ws to drive casing one foot, using 300 lb. weight falling 24 inches ±.

APPENDIX B

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-1
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 25° Partly Cloudy

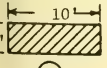
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY ____ cuyd. REACH ____ ft.

GROUND ELEV. —
TIME STARTED 8:45
TIME COMPLETED 9:10

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Brown, fine - coarse, SAND, some Gravel rubbish: boots, wire, bricks	E		
2'		E		
3'	FILL	E		
4'	Fill - Brown, fine-coarse SAND and GRAVEL	E	2A	
5'		E	2A	
6'	FILL	E	2A	
7'	Fine-coarse SAND, some fine-coarse Gravel	E	1A	
8'		E	1A	
9'		E	1A	
10'		E	1A	
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



VOLUME = 14.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-3
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 25° Partly Cloudy

EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY ____ cu.yd. REACH ____ ft.

GROUND ELEV. ____
TIME STARTED 9:50
TIME COMPLETED 10:30

DEPTH	SOIL DESCRIPTION	EXCAV EFFORT	BOULDER COUNT QTY CLASS	REMARK No.
0				
1'	Red-brown, fine-coarse SAND, some fine-coarse Gravel, wood Rubbish: many bricks	M		
2'		M		
3'		M		
4'		M		
5'	FILL	M		
6'	Dark brown, fine-coarse SAND, some fine-coarse Gravel Rubbish	E	1A	
7'		E	1A	
8'				
9'	FILL			
10'	Red-brown, fine-coarse SAND, GRAVEL, rubbish FILL	E		1
11'				
12'				
13'				
14'				

REMARKS: (1) GWT @ 10.0' @ approx. mid-tide: 10:30AM 12/20/78

TEST PIT PLAN

VOLUME = 11.9 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-4
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 25° Partly Cloudy

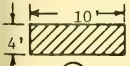
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY cuyd REACH ft

GROUND ELEV.
TIME STARTED 10:40
TIME COMPLETED 11:00

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Brown, fine-coarse, SAND, some fine-coarse Gravel	E	1A	
2'		E	1A	
3'		E	1A	
4'	FILL	E	1A	
5'	Gray, Silty CLAY Rubbish	E		
6'		E		
7'		E		
8'		E		
9'		E		
10'	FILL	E		
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



VOLUME = 14.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-5
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 25° Partly Cloudy

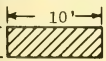
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY cuyd REACH ft

GROUND ELEV.
TIME STARTED 11:05
TIME COMPLETED 11:30

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Brown, fine-coarse SAND, some fine-coarse Gravel, little clayey Silt.	E		
2'		E		
3'	FILL	E		
4'	Gray, fine-coarse SAND and Silty CLAY	E		1
5'	Rubbish	E		
6'	FILL	M		
7'	Black, fine-coarse SAND and SILT (oily), wood,	M		
8'	Rubbish: bottles, bricks	M		
9'		M		
10'	FILL	M		
11'		M		
12'				
13'				
14'				

REMARKS: (1) From 3.0' to 10.0' water was trickling through sides of excavation.

TEST PIT PLAN



VOLUME = 16.3 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-6
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 30° Partly Cloudy

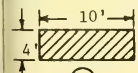
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY cu.yd. REACH ft

GROUND ELEV.
TIME STARTED 11:35
TIME COMPLETED 12:00

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Brown, fine-coarse SAND, little clayey Silt, wood, roots	E		
2'		E		
3'		E		
4'		E		
5'	FILL	E		
6'	Black, fine-coarse SAND and SILT (oily), wood	M		
7'	Rubbish: bottles, bricks	M		
8'	FILL	M		
9'	Gray-black CLAY & SILT (oily), wood Rubbish	M		
10'	FILL	M		
11'	Gray CLAY & SILT, Rubbish: paper	M		
12'	FILL	M		
13'				
14'				

REMARKS: (1) From 5.0' to 12.0' water was trickling through the sides of the excavation.

TEST PIT PLAN



VOLUME = 17.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
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V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) — G.W.L

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-7
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 30° Partly Cloudy

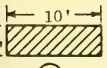
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY ____ cu.yd. REACH ____ ft.

GROUND ELEV. ____
TIME STARTED 12:30
TIME COMPLETED 12:50

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK No.
0				
1'	Brown, fine-coarse SAND, little fine-coarse Gravel, little clayey Silt. Rubbish	E		
2'	FILL	E		
3'		M		
4'	Dark brown, fine-coarse, SAND, some Silt (oily), little fine-coarse Gravel, wood, Rubbish: boots, paper, rubber	M	1A	
5'		M		
6'	Encountered 1 yd^3 piece of granite.	M	1A	
7'		M		
8'		M	1A	
9'		M	1A	
10'	FILL	M	1A	
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



NORTH

VOLUME = 14.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC. GEOTECHNICAL CONSULTANTS	PROJECT DESCRIPTION Columbia Point LOCATION Boston, Mass.	TEST PIT No. TP-8 FILE No. U2217 DATE 12/20/78

GZD ENGINEER _____ WEATHER _____

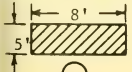
EXCAVATION EQUIPMENT
CONTRACTOR _____
OPERATOR _____
MAKE _____ MODEL _____
CAPACITY _____ cu.yd. REACH _____ ft.

GROUND ELEV. _____
TIME STARTED _____
TIME COMPLETED _____

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0				
1'	Brown, fine-coarse SAND, little Gravel, little Clayey Silt, Rubbish: many bricks	M		
2'	FILL	M		
3'	Dark brown-black, SAND & SILT, wood, Rubbish: bricks	M		
4'	Many large pieces of granite as large as 3 yd^3.	M		
5'		H		
6'		H		
7'		H		
8'	FILL	H		
9'	Granite and rock @ base of pit @ 8.0'.			
10'				
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



VOLUME = 11.8 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
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V - VERY
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EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-9
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Partly Cloudy

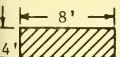
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY ____ cu.yd REACH ____ ft

GROUND ELEV. ____
TIME STARTED 1:45
TIME COMPLETED 2:05

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Red-brown, fine-coarse SAND, little fine-coarse Gravel, wood. Rubbish: metal, wire.	E		
2'		E		
3'		E		
4'	FILL	E		
5'	Dark brown-black SAND & SILT (oily), wood.	E		
6'	Rubbish: paper, cans, wire	E		
7'		M	1A	
8'		M		
9'		M	1A	
10'	FILL	M	1A	
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



NORTH

VOLUME = 11.9 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
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GR. - GRAY
BN. - BROWN
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EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-10
FILE No. U2217
DATE 12/20/78

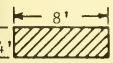
EXCAVATION EQUIPMENT
GZD ENGINEER G. Matthews
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
WEATHER 35° Partly Cloudy
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY ____ cu.yd REACH ____ ft

GROUND ELEV. ____
TIME STARTED 2:15
TIME COMPLETED 2:40

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK No.
0				
1'	Red Brown, fine-coarse SAND, some fine-coarse Gravel.	E		
	Rubbish: brick			
2'		E		
	Pieces of shattered rock			
3'		E		
	FILL			
4'		E		
5'	Dark brown-black SAND & SILT (oily), wood	E		
	Rubbish: brick			
6'		E		
7'		E		
8'		E		
9'		E		
	FILL			
10'		E		
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



VOLUME = 11.9 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-11
FILE No. U2217
DATE 12/20/78

GZD ENGINEER C. Matthews
WEATHER 35° Partly Cloudy

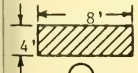
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY ____ cu.yd. REACH ____ ft.

GROUND ELEV. ____
TIME STARTED 2:50
TIME COMPLETED 3:15

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Red-brown, fine-coarse SAND, some fine-coarse Gravel,	E		
	trace Silt, wood			
2'	Rubbish: many bottles, rags, plastic, metal	E		
3'		E		
4'		E		
5'		E		
6'		E		
7'		E		
8'		M		
9'		M		
10'	FILL	M		1
11'				
12'				
13'				
14'				

REMARKS: (1) GWT @ 10.0' (3:00PM 12/20/78 high tide).

TEST PIT PLAN



NORTH

VOLUME = 11.9 cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
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GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E —— EASY
M —— MODERATE
D —— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-12
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

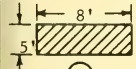
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY cu.yd. REACH ft.

GROUND ELEV.
TIME STARTED 8:30
TIME COMPLETED 8:50

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Red-brown, decomposed wood - PEAT Rubbish: bricks, bottles, paper	E		
2'	FILL	E		
3'	Light-brown SAND and rubbish	E		
4'	FILL	E		
5'	Brown fine-coarse SAND, little fine-coarse Gravel	E	2A	
6'	Approx. 20 12.0' pieces of granite	E	4A	
7'	Shells	E	6A	
8'	FILL	E	6A	
9'	Organic fibrous CLAY & SILT (strong organic odor)	E		
10'		E		
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



VOLUME = _____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR - GRAY
BN - BROWN
YEL - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION: Columbia Point
LOCATION: Boston, Mass.

TEST PIT No. TP-13
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

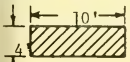
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY ____ cuyd REACH ____ ft

GROUND ELEV. ____
TIME STARTED 9:00
TIME COMPLETED 9:20

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Brown fine-coarse SAND & GRAVEL, few bricks FILL	M	2A	
2'	Dark brown, fine-coarse SAND, some Gravel, trace Silt FILL	E	1A	
3'	Light Brown, fine-coarse SAND, little Gravel FILL	E		
4'	Dark brown, fine-coarse SAND, some Gravel, trace Silt.	M	3A	
5'	Few pieces of broken brick.	E	2A	
6'		E	1A	
7'		E	1A	
8'	FILL	E		
9'		E		
10'		E		
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



NORTH

VOLUME = _____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
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V - VERY
GR. - GRAY
BN. - BROWN
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EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-14
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

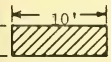
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY ____ cu.yd. REACH ____ ft.

GROUND ELEV. ____
TIME STARTED 9:30
TIME COMPLETED 9:50

DEPTH	SOIL DESCRIPTION	EXCAV EFFORT	BOULDER COUNT QTY CLASS	REMARK No.
0				
1'	Brown, fine-coarse SAND & GRAVEL, trace Silt.	M	1A	
2'	Bricks	M	2A	
3'		M	2A	
4'	Few broken pieces of granite @ 1-2 ft^3	H	4A	
5'	from 3-6'	M	2A	
6'		M	2A	
7'		M	3A	
8'		M	3A	
9'	Many broken pieces of brick.	M	2A	
10'	FILL	M	2A	
11'	Fine-coarse SAND	M		
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



VOLUME = ____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
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F/M - FINE TO MEDIUM
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GR. - GRAY
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EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-15
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

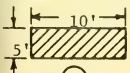
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY ____ cuyd REACH ____ ft.

GROUND ELEV. ____
TIME STARTED 9:00
TIME COMPLETED 9:20

DEPTH	SOIL DESCRIPTION	EXCAV EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Dark brown-red, fine-coarse SAND, little Gravel,	E		
	decomposed wood, few bricks, little rubbish			
2'	FILL	E		
3'	Brown, fine-coarse SAND, some Gravel, broken pieces	M	2A	
	of brick and granite			
4'		M	2A	
5'		M	3A	
6'		M	3A	
7'		H		
	Large pieces of broken granite			
8'	Bricks - wood	H		
9'		H		
	FILL			
10'		H		
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



VOLUME = _____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
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EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-16
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

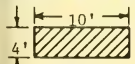
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY ____ cu.yd. REACH ____ ft.

GROUND ELEV. ____
TIME STARTED 9:30
TIME COMPLETED 9:50

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY.	BOULDER COUNT CLASS	REMARK No.
0					
1'	Dark brown SAND, some Gravel, decomposed wood, wood Rubbish: cans, wire, paper	E			
2'		E			
3'	(Vapor rising from peat and rubbish)	E			
4'		E			
5'		E			
6'		E			
7'		E			
8'	2 ft^3 piece of granite @7.0'	E	1	A	
9'		E	1	A	
10'	FILL	E			
11'					
12'					
13'					
14'					

REMARKS:

TEST PIT PLAN



VOLUME = ____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

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EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-17
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

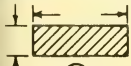
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY ____ cuyd REACH ____ ft

GROUND ELEV. ____
TIME STARTED 10:00
TIME COMPLETED 10:20

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Dark brown SAND, some Gravel, decomposed wood, wood,	E		
	Rubbish: bottles, cans, wire, paper, bricks			
2'		E		
3'		E		
	(Vapor rising from peat and rubbish)			
4'		E		
5'		E		
	2 ft^3 piece of granite @ 5.0'			
6'		E		
7'		E		
8'		E		
9'		E		
	FILL			
10'		E		
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



NORTH

VOLUME = _____ cu. yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-18
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

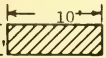
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY ____ cu.yd. REACH ____ ft

GROUND ELEV. ____
TIME STARTED 10:30
TIME COMPLETED 10:50

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0				
1'	Dark brown SAND, some Gravel, trace Silt, decomposed wood, wood,	E		
2'	Rubbish: bottles, rags, wire	E		
3'		E		
4'	(Vapor rising from soil and rubbish)	E		
5'		E		
6'		E		
7'		E		
8'		E		
9'		E		
10'	FILL	E		
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



VOLUME = ____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-19
FILE No. U2217
DATE 12/20/78

GZD ENGINEER C. Matthews
WEATHER 35° Sunny

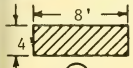
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY ____ cu.yd. REACH ____ ft

GROUND ELEV. ____
TIME STARTED 11:00
TIME COMPLETED 11:20

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Red brown SAND, some Gravel, decomposed wood, wood	E		
	Rubbish: bricks, bottles, wire			
2'		E	1A	
3'	Darker brown in color @ 3.0'	E	2A	
4'		E	2A	
	2 pieces of 2 ft^3 granite			
5'		E	2A	
6'		E	1A	
7'	FILL	E		
8'	Dark brown, fine-medium SAND, some Silt.	E		
	Pieces of plastic, bricks			
9'		E		
10'	FILL	E		
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



VOLUME = ____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-20
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

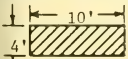
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY ____ cu.yd. REACH ____ ft.

GROUND ELEV. ____
TIME STARTED 11:30
TIME COMPLETED 12:00

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY CLASS	REMARK No.
0				
1'	Brown, fine-coarse SAND, some fine-coarse Gravel, trace Silt, strands of rubber and rags	E		
2'		E		
3'	Large pieces of granite 1-2 ft^3	E		
4'		E		
5'		E		
6'		E		
7'		E		
8'		E		
9'	Two 2 ft^3 chunks of cemented brick	E		
10'	FILL	E		
11'	Gray and brown Clayey SILT, some fine-medium Sand, roots, fibers throughout	E		
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



NORTH

VOLUME = _____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-21
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

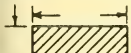
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser. B
CAPACITY ____ cu.yd. REACH ____ ft

GROUND ELEV. ____
TIME STARTED 12:30
TIME COMPLETED 12:50

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Brown, fine-coarse SAND, little Gravel, few bricks and bottles, trace rubbish	E		
2'		E		
3'		E	1A	
4'	FILL	E	1A	
5'	Dark brown-black, fine-medium SAND & SILT, few bottles & bricks	E		
6'		E		
7'		E		
8'	FILL	E		
9'	Black, Clayey SILT, little fine Sand (oily), organic Silt (no organic odor)	E		
10'		E		
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



NORTH

VOLUME = _____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-22
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

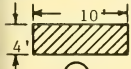
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY ____ cu.yd. REACH ____ ft.

GROUND ELEV. ____
TIME STARTED 1:00
TIME COMPLETED 1:15

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0				
1'	Dark brown, fine-coarse SAND, little Gravel, decomposed wood, wood, little rubbish: rags,	E		
2'	bottles	E		
3'		E	2A	
4'	FILL	E	2A	
5'		E	1A	
6'	Dark brown-black, fine SAND & SILT, rags and pieces of wood	E	1A	
7'		E		
8'		E		
9'	Dark brown, Clayey SILT and fine-medium SAND with large pieces of wood 1 to 2 ft^3	E		
10'		E		
11'		E		
12'	FILL			
13'				
14'				

REMARKS:

TEST PIT PLAN



VOLUME = _____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-23
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

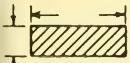
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY ____ cu.yd. REACH ____ ft.

GROUND ELEV. ____
TIME STARTED 1:20
TIME COMPLETED 1:40

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Brown, fine-coarse SAND, some Gravel, wood, rubbish, bottles, wire	E		
2'		E		
3'		E		
4'		E	2A	
5'		E	2A	
6'		E	2A	
7'		E		
8'	2 large pieces of granite ≈2 ft^3 Darker brown in color	E		
9'		E		
10'		E		
11'	FILL	M	2B	
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



NORTH

VOLUME = _____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-24
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

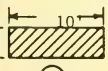
EXCAVATION EQUIPMENT
CONTRACTOR DiCarlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY ____ cu.yd. REACH ____ ft

GROUND ELEV. ____
TIME STARTED 1:45
TIME COMPLETED 2:00

DEPTH	SOIL DESCRIPTION	EXCAV EFFORT	BOULDER COUNT QTY CLASS	REMARK No.
0				
1'	Dark brown, fine-coarse SAND & GRAVEL, wood, bricks	E	2A	
	boulders, Rubbish: wire, little broken glass	E	3A	
2'				
3'		E	3A	
4'		M	3A	
5'		M	3A/1B	
6'		M	3A/2B	
7'	Large pieces of granite.	H		
8'	FILL	H		
9'	CLAY & SILT, little Sand, little Gravel	M		
	Rubbish: borken blass			
10'	FILL	M		
11'	Medium-coarse SAND & fine-coarse GRAVEL	M		
12'		M		
13'				
14'				

REMARKS:

TEST PIT PLAN



VOLUME = ____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS) ▽ G.W.L

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-25
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

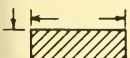
EXCAVATION EQUIPMENT
CONTRACTOR Di Carlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY ____ cu.yd. REACH ____ ft

GROUND ELEV. ____
TIME STARTED 2:05
TIME COMPLETED 2:20

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY. CLASS	REMARK No.
0				
1'	Brown, fine-coarse SAND, little Gravel.	E	1A	
	FILL			
2'		E	1A	
3'	Dark brown, fine-coarse SAND, some Gravel, trace Silt, wood, many bricks, few metal rods	E	1A	
4'	Very slight organic odor	E	1A	
5'	Few small pieces of granite	E	2A	
6'		M	2A	
7'	Many pieces of wood	M	2A	
8'		M	2A	
9'	FILL	M	2A	
10'	Gray black clayey SILT & fine-coarse SAND (slightly oily pieces of wood) Organic Silt	M		
11'				
12'				
13'				
14'				

REMARKS:

TEST PIT PLAN



NORTH

VOLUME = _____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L.

TEST PIT FIELD LOG

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
GEOTECHNICAL CONSULTANTS

PROJECT
DESCRIPTION Columbia Point
LOCATION Boston, Mass.

TEST PIT No. TP-26
FILE No. U2217
DATE 12/20/78

GZD ENGINEER G. Matthews
WEATHER 35° Sunny

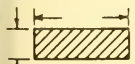
EXCAVATION EQUIPMENT
CONTRACTOR Di Carlo Bros.
OPERATOR Mario
MAKE Dynahoe MODEL 190 Ser.B
CAPACITY ____ cu.yd REACH ____ ft

GROUND ELEV. ____
TIME STARTED 2:30
TIME COMPLETED 2:50

DEPTH	SOIL DESCRIPTION	EXCAV. EFFORT	BOULDER COUNT QTY.	BOULDER COUNT CLASS	REMARK No.
0	Brown fine-coarse SAND, some Gravel	E			
1'	FILL				
2'	Dark brown, fine-coarse SAND, some Gravel, trace Silt, few pieces of granite, large pieces of wood	E			
3'		E		1A	
4'		E		1A	
5'		E			
6'		E			
7'	FILL	E			
8'		E			
9'	Fibrous organic CLAY & SILT, some fine-coarse Sand	E			
10'	Gray-black, clayey SILT & fine-coarse SAND (slightly oily) pieces of wood - organic Silt.	E			
11'					
12'					
13'					
14'					

REMARKS:

TEST PIT PLAN



VOLUME = ____ cu.yd.

LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6" - 18"	A
18" - 36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
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F/M - FINE TO MEDIUM
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GR - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E ——— EASY
M ——— MODERATE
D ——— DIFFICULT

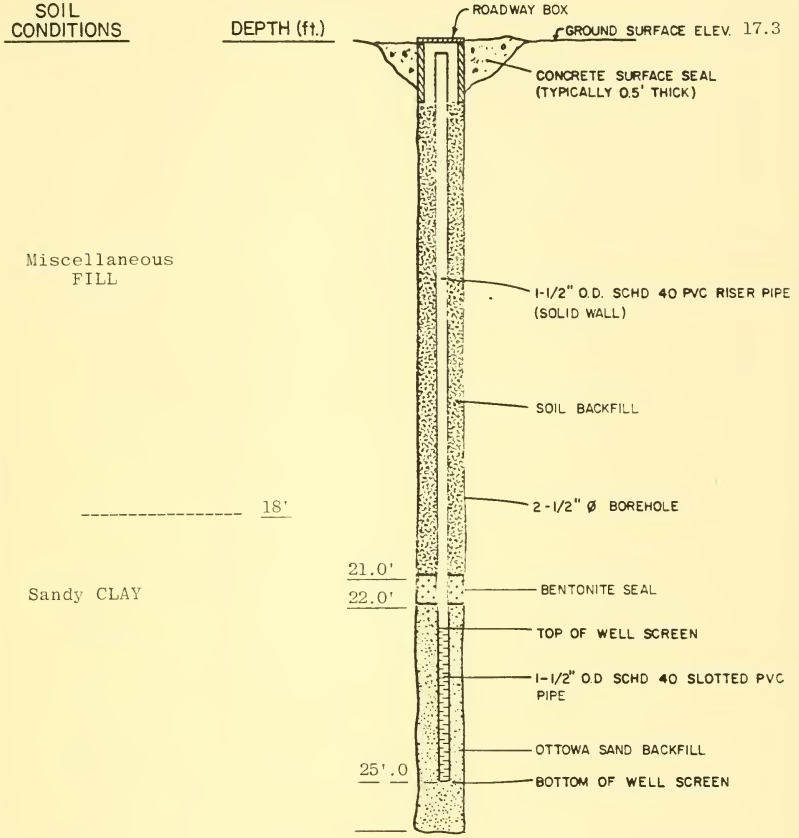
GROUNDWATER

ELAPSED TIME TO READING (HRS.) ____ G.W.L

APPENDIX C

WELL No. G-1

SUMMARY OF SUBSURFACE CONDITIONS



NOTE: NOT TO SCALE

WELL NUMBER G-1 DATE OF INSTALLATION 12.18/78

DEPTH/ELEVATION BOTTOM OF BORING 174'.0 / -156.7

DEPTH/ELEVATION BOTTOM OF WELL POINT 25'.0 / -7.7

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER G. DeSimone INSPECTOR G. Mathews

GOLDBERG, ZOINO, DUNNICLIFF & ASSOC., INC
GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

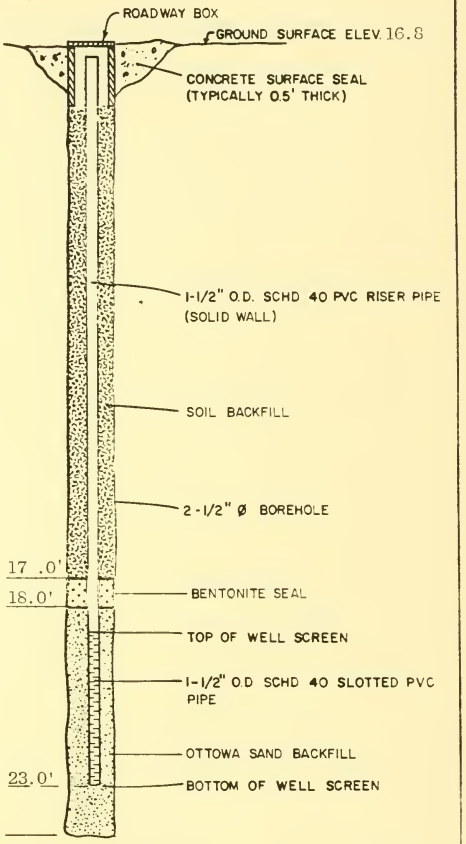
OBSERVATION WELL INSTALLATION REPORT

DATE 5/79
FILE No. 2286.1

WELL No. G-5

SUMMARY OF SUBSURFACE CONDITIONS

SOIL CONDITIONS	DEPTH (ft.)
Miscellaneous FILL	
	17.0'
	18.0'
SAND	
	20.0'
Sandy CLAY	
	23.0'


ROADWAY BOX
GROUND SURFACE ELEV. 16.8
CONCRETE SURFACE SEAL (TYPICALLY 0.5' THICK)
1-1/2" O.D. SCHD 40 PVC RISER PIPE (SOLID WALL)
SOIL BACKFILL
2-1/2" Ø BOREHOLE
BENTONITE SEAL
TOP OF WELL SCREEN
1-1/2" O.D SCHD 40 SLOTTED PVC PIPE
OTTOWA SAND BACKFILL
BOTTOM OF WELL SCREEN

NOTE: NOT TO SCALE

WELL NUMBER G-5 DATE OF INSTALLATION 12/19/79

DEPTH/ELEVATION BOTTOM OF BORING 201.0' / -184.2

DEPTH/ELEVATION BOTTOM OF WELL POINT 23.0' / -6.2

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER S. DeSimone INSPECTOR G. Mathews

GOLDBERG, ZOINO, DUNNICLIFF & ASSOC., INC
GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

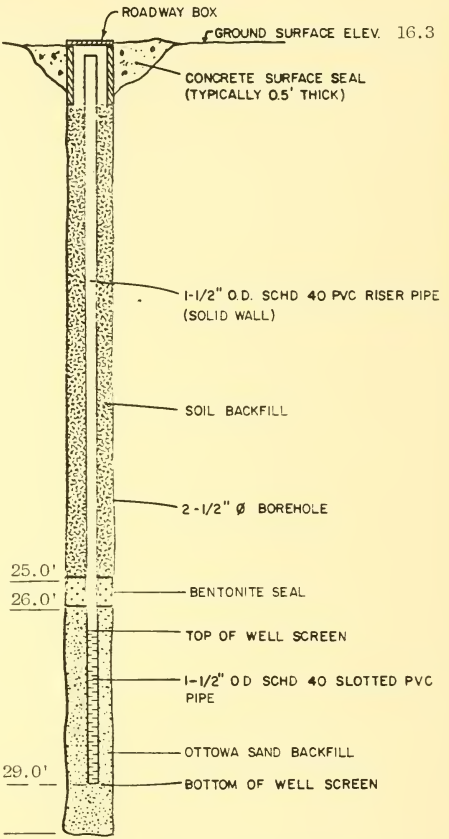
OBSERVATION WELL INSTALLATION REPORT

DATE 5/79
FILE No. 2286.1

WELL No. G-6

SUMMARY OF SUBSURFACE CONDITIONS

SOIL CONDITIONS	DEPTH (ft.)
FILL	
	9.5'
ORGANIC SILT	
	15.5'
SAND	
	29.0'



NOTE: NOT TO SCALE

WELL NUMBER G-6 DATE OF INSTALLATION 12/7/79

DEPTH/ELEVATION BOTTOM OF BORING 60.0' / -41.7

DEPTH/ELEVATION BOTTOM OF WELL POINT 29.0' / -10.7

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER T. Sasso INSPECTOR G. Mathews

GOLDBERG, ZOINO, DUNNICLIFF & ASSOC., INC.
GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

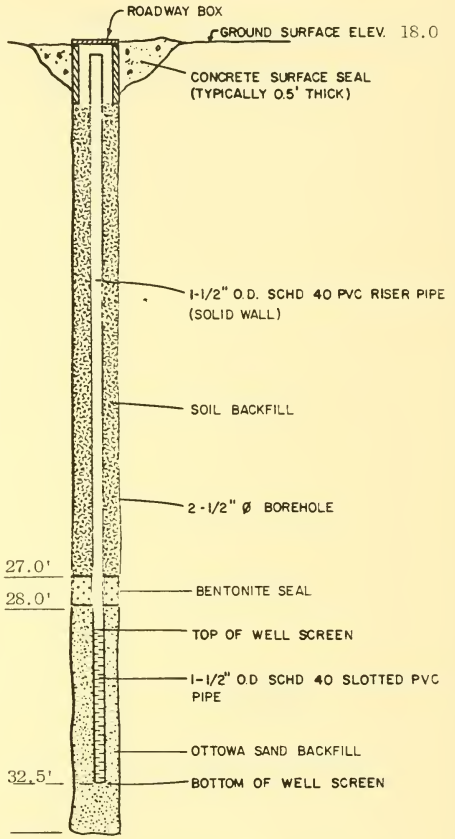
OBSERVATION WELL INSTALLATION REPORT

DATE 5/79
FILE No. 2286.1

WELL No. G-7

SUMMARY OF SUBSURFACE CONDITIONS

SOIL CONDITIONS	DEPTH (ft.)
FILL	
	19.0'
SAND AND GRAVEL mixed with ORGANIC SILT	
	27.0'
	28.0'
Silty SAND	
	32.5'


ROADWAY BOX
GROUND SURFACE ELEV. 18.0
CONCRETE SURFACE SEAL (TYPICALLY 0.5' THICK)
1-1/2" O.D. SCHD 40 PVC RISER PIPE (SOLID WALL)
SOIL BACKFILL
2-1/2" Ø BOREHOLE
BENTONITE SEAL
TOP OF WELL SCREEN
1-1/2" O.D SCHD 40 SLOTTED PVC PIPE
OTTOWA SAND BACKFILL
BOTTOM OF WELL SCREEN

NOTE - NOT TO SCALE

WELL NUMBER G-7 DATE OF INSTALLATION 12/11/78

DEPTH/ELEVATION BOTTOM OF BORING 60.0' / -42.0

DEPTH/ELEVATION BOTTOM OF WELL POINT 32.5' / -14.5

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER S. DeSimone INSPECTOR G. Mathews

GOLDBERG, ZOINO, DUNNICLIFF & ASSOC., INC
GEOTECHNICAL CONSULTANTS

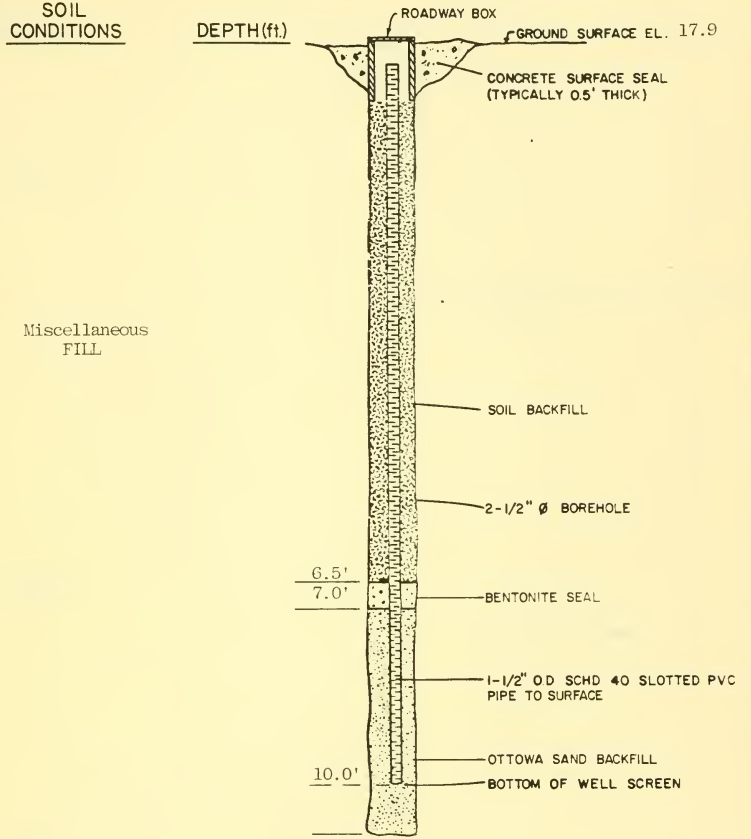
COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

OBSERVATION WELL INSTALLATION REPORT

DATE 5/79
FILE No. 2286.1

WELL No. G-8

SUMMARY OF SUBSURFACE CONDITIONS



NOTE: NOT TO SCALE

WELL NUMBER G-8 DATE OF INSTALLATION 12/13/78

DEPTH/ELEVATION BOTTOM OF BORING 60.0' / -42.1

DEPTH/ELEVATION BOTTOM OF WELL POINT 10.0' / 7.9

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER S. DeSimone INSPECTOR G. Mathews

GOLDBERG, ZOINO, DUNNICLIFF & ASSOC., INC
GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

METHANE WELL INSTALLATION REPORT

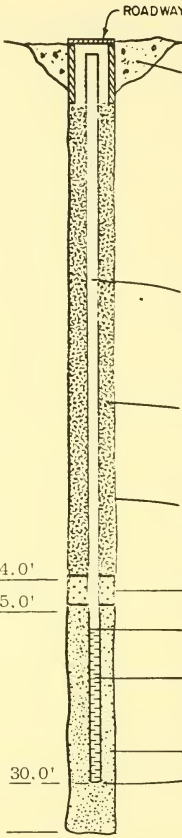
DATE 5/79

FILE No. 2286.1

WELL No. G-9

SUMMARY OF SUBSURFACE CONDITIONS

SOIL CONDITIONS	DEPTH (ft.)
Miscellaneous FILL	
	10.5'
ORGANIC SILT	15.0'
	24.0'
SAND AND GRAVEL	25.0'
	30.0'


ROADWAY BOX
GROUND SURFACE ELEV. 18.7
CONCRETE SURFACE SEAL (TYPICALLY 0.5' THICK)
1-1/2" O.D. SCHD 40 PVC RISER PIPE (SOLID WALL)
SOIL BACKFILL
2-1/2" Ø BOREHOLE
BENTONITE SEAL
TOP OF WELL SCREEN
1-1/2" O.D SCHD 40 SLOTTED PVC PIPE
OTTOWA SAND BACKFILL
BOTTOM OF WELL SCREEN

NOTE: NOT TO SCALE

WELL NUMBER G-9 DATE OF INSTALLATION 12/19/79

DEPTH/ELEVATION BOTTOM OF BORING 60.0' / -41.3

DEPTH/ELEVATION BOTTOM OF WELL POINT 30.0' / -11.3

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER T. Sasso INSPECTOR G. Mathews

GOLDBERG, ZOINO, DUNNICLIFF & ASSOC., INC
GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

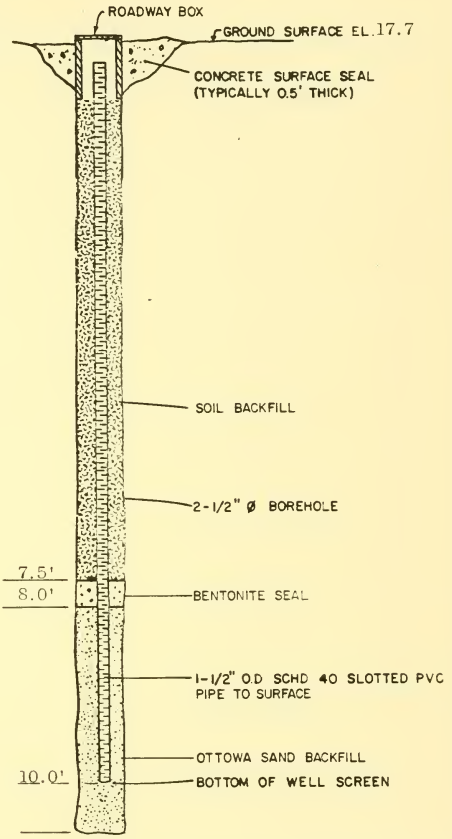
OBSERVATION WELL INSTALLATION REPORT

DATE 5/79
FILE No. 2286.1

WELL No. G-12

SOIL CONDITIONS

DEPTH (ft.)



Miscellaneous FILL

ORGANIC SILT

MARY OF SUBSURFACE CONDITIONS

NOTE: NOT TO SCALE

WELL NUMBER G-12 DATE OF INSTALLATION 12/14/78

DEPTH/ELEVATION BOTTOM OF BORING 60.0' / -42.3

DEPTH/ELEVATION BOTTOM OF WELL POINT 10.0' / 7.7

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER S. DeSimone INSPECTOR G. Mathews

GOLDBERG, ZOINO, DUNNICLIFF & ASSOC., INC
GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

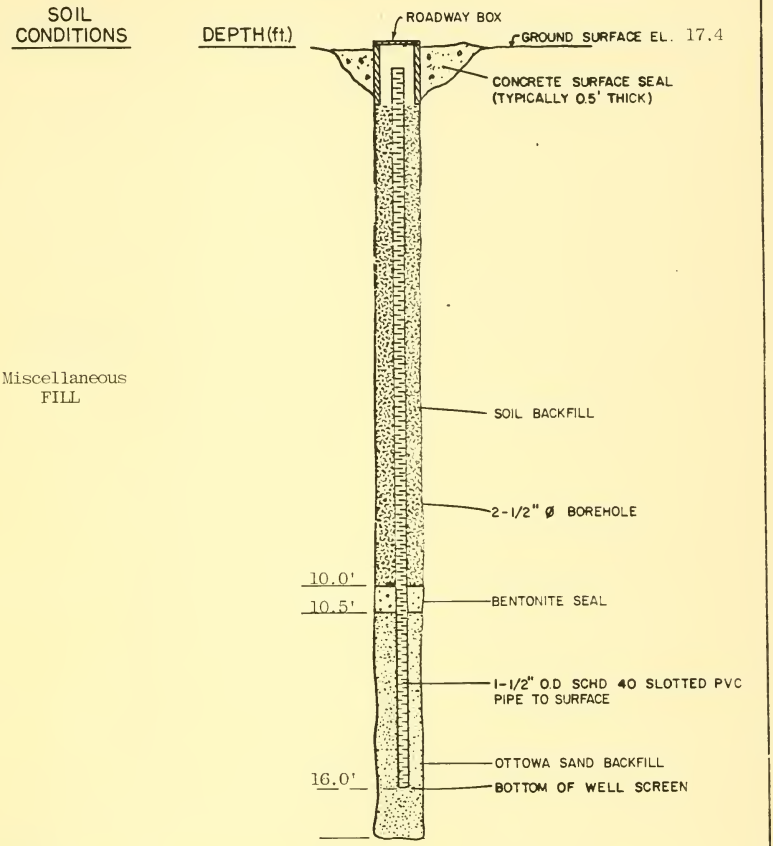
METHANE WELL INSTALLATION REPORT

DATE 5/79

FILE No. 2286.1

WELL No. G-13

SUMMARY OF SUBSURFACE CONDITIONS



NOTE : NOT TO SCALE

WELL NUMBER G-13 DATE OF INSTALLATION 1/3/79

DEPTH/ELEVATION BOTTOM OF BORING 190.0' / -172.6

DEPTH/ELEVATION BOTTOM OF WELL POINT 16.0' / 1.4

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER J. DeSimone INSPECTOR G. Mathews

GOLDBERG,ZOINO,DUNNICLIFF & ASSOC., INC
GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

METHANE WELL INSTALLATION REPORT

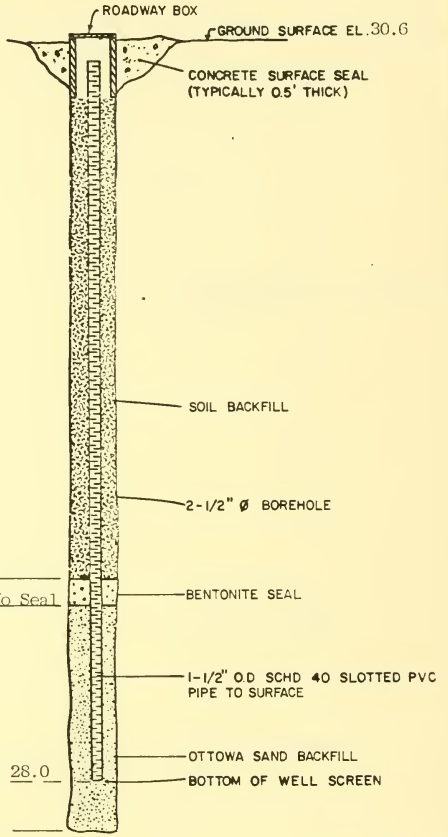
DATE 5/79

FILE No. 2286.1

WELL No. G-14A

SUMMARY OF SUBSURFACE CONDITIONS

SOIL CONDITIONS	DEPTH (ft.)
Miscellaneous FILL	



NOTE: NOT TO SCALE

WELL NUMBER G-14A DATE OF INSTALLATION 1/17/79

DEPTH/ELEVATION BOTTOM OF BORING 163.0' / -132.4

DEPTH/ELEVATION BOTTOM OF WELL POINT 28.0' / 2.6

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER J. Centrella INSPECTOR G. Mathews

GOLDBERG, ZOINO, DUNNICLIFF & ASSOC., INC.
GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

METHANE WELL INSTALLATION REPORT

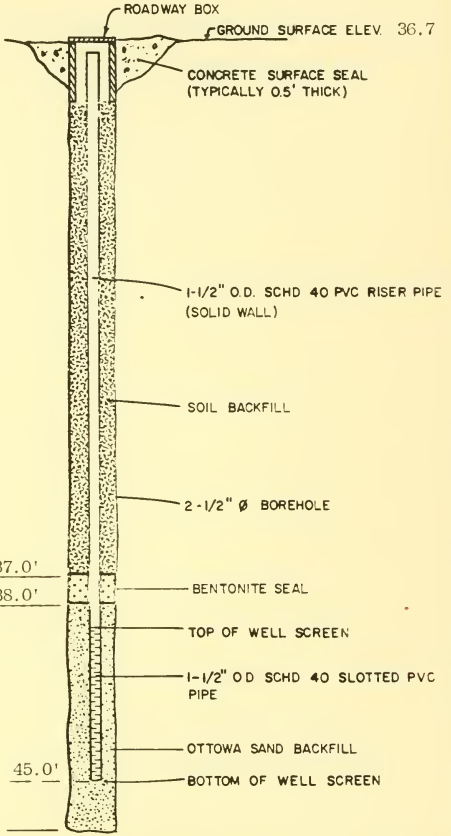
DATE 5/79

FILE No. 2286.1

WELL No. G-17

SUMMARY OF SUBSURFACE CONDITIONS

SOIL CONDITIONS	DEPTH (ft.)
Miscellaneous FILL	
	19.0'
SAND AND GRAVEL	
	32.0
SAND, trace Organic Silt	
SAND	



NOTE: NOT TO SCALE

WELL NUMBER G-17 DATE OF INSTALLATION 1/4/79

DEPTH/ELEVATION BOTTOM OF BORING 188.0' / -151.3

DEPTH/ELEVATION BOTTOM OF WELL POINT 45.0' / -8.3

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER S. DeSimone INSPECTOR G. Mathews

GOLDBERG, ZOINO, DUNNICLIFF & ASSOC., INC
GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

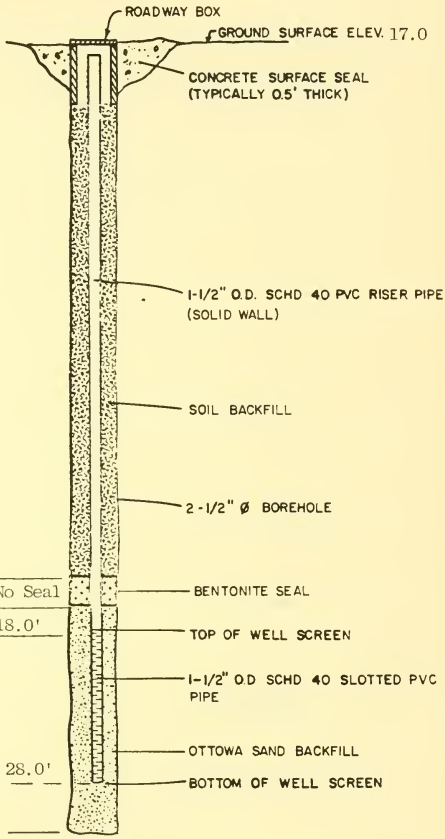
OBSERVATION WELL INSTALLATION REPORT

DATE 5/79
FILE No. 2286.1

WELL No. G-19

SUMMARY OF SUBSURFACE CONDITIONS

SOIL CONDITIONS	DEPTH (ft.)
Miscellaneous FILL	
	14.0'
Silty SAND	
	28.0'



NOTE: NOT TO SCALE

WELL NUMBER G-19 DATE OF INSTALLATION 1/22/79

DEPTH/ELEVATION BOTTOM OF BORING 210.5' / -193.5

DEPTH/ELEVATION BOTTOM OF WELL POINT 28.0' / -11.0

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER J. Young INSPECTOR R. Lai

GOLDBERG, ZOINO, DUNNICLIFF & ASSOC., INC.
GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

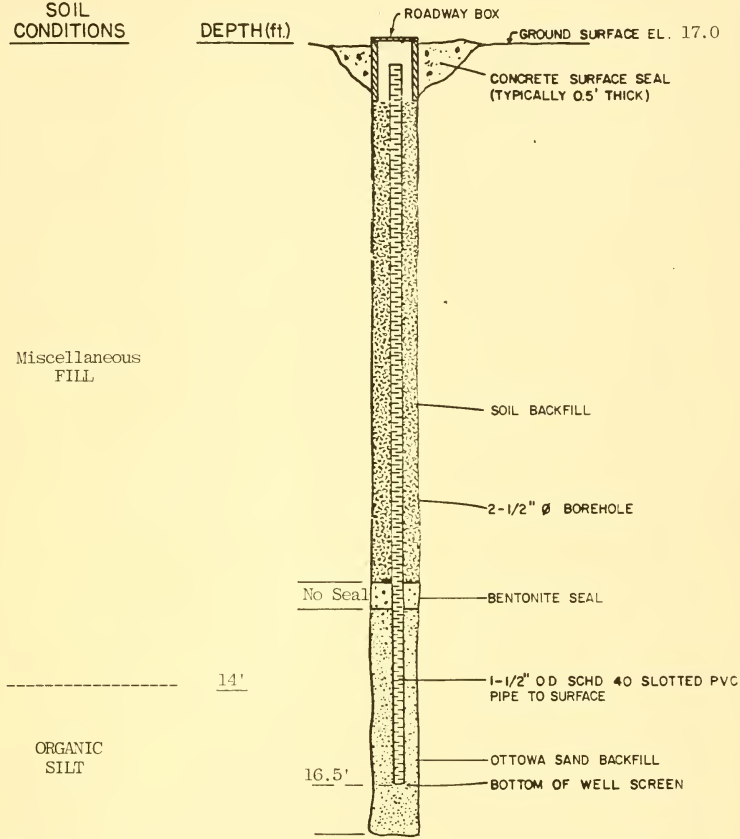
OBSERVATION WELL INSTALLATION REPORT

DATE 5/79

FILE No. 2286.1

WELL No. G-21

SUMMARY OF SUBSURFACE CONDITIONS



NOTE: NOT TO SCALE

WELL NUMBER G-21 DATE OF INSTALLATION 1/31/79

DEPTH/ELEVATION BOTTOM OF BORING 182.5' / -165.5

DEPTH/ELEVATION BOTTOM OF WELL POINT 16.5' / 0.5

CONTRACTOR Carr-Dee Test Boring and Construction Corp.

DRILLER J. Centrella INSPECTOR R. Lai

GOLDBERG, ZOINO, DUNNICLIFF & ASSOC., INC
GEOTECHNICAL CONSULTANTS

COLUMBIA POINT REDEVELOPMENT
BOSTON, MASS.

METHANE WELL INSTALLATION REPORT

DATE 5/79

FILE No. 2286.1

APPENDIX D

TEST NO.	SYM.	MATERIAL SOURCE	REMARKS
S1.1		Boring No. G 19 Sample No. 19 Depth 208.5'-210.5'	Grey fine to coarse Sand; some fine Gravel, some Clayey Silt.

COLUMBIA POINT
BOSTON, MASSACHUSETTS

GRADATION TESTS

BORING NO. G 19 TEST SERIES NO. 1
SAMPLE 19
DEPTH 208.5'-210.5' DATE April 79
TECH.
REVIEWER FILE 2286.1

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
CONSULTANTS IN GEOTECHNICAL ENGINEERING

TEST NO.	SYM.	MATERIAL SOURCE	REMARKS
S2.1		Boring No. G 10 Sample Nos. 20, 21 Depth 188'-195'	Grey fine to coarse Sand and Gravel, some+ Clayey Silt.

COLUMBIA POINT
BOSTON, MASSACHUSETTS

GRADATION TESTS

BORING NO. G 10
SAMPLE 20, 21
DEPTH 188'-195'
TECH. _____
REVIEWER _____

TEST SERIES NO. 2
DATE April 1979

FILE 2286.1

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
CONSULTANTS IN GEOTECHNICAL ENGINEERING

COLUMBIA POINT
BOSTON, MASSACHUSETTS

GRADATION TESTS

BORING NO. G 19 TEST SERIES NO. 1
SAMPLE 19
DEPTH 208.5'-210.5' DATE April 79
TECH. _____
REVIEWER _____ FILE 2286.1

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
CONSULTANTS IN GEOTECHNICAL ENGINEERING

TEST NO.	SYM.	MATERIAL SOURCE	REMARKS
S2.1		Boring No. G 10 Sample Nos. 20, 21 Depth 188'-195'	Grey fine to coarse Sand and Gravel, some Clayey Silt.

COLUMBIA POINT
BOSTON, MASSACHUSETTS

GRADATION TESTS

BORING NO. G 10
SAMPLE 20, 21
DEPTH 188'-195'
TECH. _____
REVIEWER _____

TEST SERIES NO. 2
DATE April 1979

FILE 2286.1

GOLDBERG, ZOINO, DUNNICLIFF & ASSOCIATES, INC.
CONSULTANTS IN GEOTECHNICAL ENGINEERING

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